

MEGA PROJECTS AND MEGA RISKS:

Lessons for Decision-makers through a Comparative Analysis of Selected Large-scale Transport Infrastructure Projects in Europe, USA and Asia Pacific

VOLUME 5: OMEGA RESEARCH PROGRAMME UK AND INTERNATIONAL CASE STUDIES: COMPARISONS, FINDINGS AND LESSONS

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Document Navigation Note

The figure directly below offers an overview of the overall OMEGA research programme Study Methodology. The area highlighted in red is dealt with by this volume of the report.

The OMEGA Study Methodology



1. Introduction to Volume 5

1.1 Purposes and structure of Volume 5

The main purposes of Volume 5 are essentially to present the OMEGA Centre's synthesis of the research findings, to provide a series of lessons for decision-makers and practitioners based on these findings and to explain our on-going dissemination strategy – which represents the key activity of the OMEGA Centre in the period following submission of this Report.

The volume is divided into eight principal sections, as follows:

- Section 1: describes the purposes and content of Volume 5 and presents the approach adopted in the overall synthesis of research findings.
- Section 2: presents a compare and contrast analysis of qualitative and quantitative observations extracted from the 'four tests' findings associated with all completed case study analyses (Test 1 meeting project objectives; Test 2 sustainable development visions and challenges; Test 3 Treatment of risk, uncertainty, complexity and context in decision-making; Test 4 Synthesis of Tests 1-3).
- Section 3: presents output from a 'Sensemaking' analysis of pre-hypothesis research data undertaken by Cognitive Edge Pty. (at the time of writing this output was still awaited).
- Section 4: highlights the key themes and lessons and extracted from the OMEGA Project 1 which have been used as foci around which to cluster generic lessons emerging from the UK and international case studies and Country Summary Reports.
- Section 5: provides an account of the patterns of case study and country-based responses to the three OMEGA Overall Research Questions and three OMEGA Overall Research Hypotheses. Each set of responses is accompanied by illustrative examples drawn from individual case studies and Partner Country Summary Reports.
- Section 6: provides a series of generic lessons clustered around twelve important themes and lessons extracted from the OMEGA 1 Project. Each lesson is accompanied by a clarification statement and, like Section 5, illustrative examples drawn from individual OMEGA case studies.
- Section 7: explains 'who should do what differently' by presenting a series of generic lessons allocated to four broad stakeholder categories namely, politicians, public sector actors, private sector actors and 'others'.
- Section 8: concludes this Volume by focusing on the OMEGA Centre's 'making a difference strategy' which highlights how and when the research findings will continue to be disseminated.

Readers of this Volume may encounter a degree of repetition of key findings within and between (particularly) Section 5 (Responses to the OMEGA Overall Research Questions and Hypotheses) and Section 6 (Generic Lessons). This is rather unavoidable given the structure of the synthesis framework described below (1.2), which provides for the responses to ORQs and ORHs to *inform* lesson formulation.

1.2 Development of synthesis methodology

The challenges associated with synthesising the findings of a major research programme of this depth and breadth were especially daunting. In particular, given the large volume of information and data produced for each case study and the differences associated with each OMEGA Partner's country context, there is a very real issue associated with identifying the appropriate level of 'depth' of compare and contrast analysis with which the synthesis stage can afford to deal – delving very deeply into certain themes and topics of interest risks

having too narrow a focus, whilst the converse approach risks providing an analysis that is seen as 'not getting fully to the heart of the matter'. Faced with this, the OMEGA Centre has inevitably had to select a balance between breadth and depth which, it is believed, yields important lessons for decision-makers, while accepting that the database provided by the research can and should be subsequently interrogated by others so as to extend and enhance the knowledge of MUTP planning, appraisal and delivery. Put simply, it is readily acknowledged that the synthesis presented in this Volume *could* have been focused differently – depending upon the area of interest in question.

It is against this background that the OMEGA centre has returned to the question of which synthesis methodology and approach to adopt on a number of occasions – in conjunction with both OMEGA Partners and the Volvo Research and Education Foundation's (VREF) representatives (Måns Lönnroth and Staffan Jacobsson – whose assistance has been greatly appreciated).

Most significantly, in early 2009 Staffan Jacobsson (a VREF Scientific Council member) alerted the OMEGA Centre Team to a paper that he had co-authored concerning analytical frameworks relating to the functional dynamics of technological innovation systems¹. The Centre team considered that this paper offered a very useful framework that could (with some significant adaptation) provide a sound basis for synthesising the overall research findings. With that in mind the OMEGA Centre team prepared a paper for discussion with VREF representatives in March 2009 – entitled, 'Bergek et al's analytical framework of functional dynamics of technological innovation systems (TISS): Proposal for application to mega transport projects (MUTPs) as researched by the OMEGA Centre', March 2009 (see Appendix 9). Based on this, the broad approach proposed in the March 2009 paper was discussed with Partners (at the OMEGA Lund Workshop, April 2009).

The March 2009 Paper concluded that innovation systems and MUTPs fundamentally share much common ground by virtue of the fact that:

- both are systems that comprise a group of components (devices, objects and agents) that ostensibly serve a common purpose, and;
- MUTPs may be seen as technological innovation systems in their own right (representing evolving complex systems that are subject to considerable fluidity in the face of ever changing contextual elements/challenges).

The synthesis framework proposed in the March 2009 paper is shown by Figure 1.1. It comprised seven main sequential steps, as follows:

- **Step 1:** Define the scope of the research in terms of: knowledge field; product/artefact/service components; breadth of analysis; depth of analysis, and; spatial domain.
- Step 2: Define the structural components of the research focus (MUTPs) i.e. actors; networks, and; institutions.
- **Step 3a:** Identify key functions (of MUTP planning, appraisal, implementation & operation processes) i.e. mapping the functional patterns and dynamics (and contexts) that determined how each project evolved.
- **Step 3b:** Identify the achieved functional pattern (of each MUTP) i.e. determine how each Case Study Project performed in relation to the '4 Tests'.
- Step 4a: Identify patterns of generic and context-specific influences on project performance.
- **Step 4b:** Setting process goals i.e. the development of initial MUTP lessons for further assessment.

¹ Bergek A, Jacobsson S, Carlsson B, Lindmark S, Rickne A (2008). 'Analyzing the functional dynamics of technological innovation systems: A scheme of analysis'. *Research Policy* - Research Policy 37 (2008), pp 407–429.

- **Step 5:** Identify the generic and context-specific nature of inducement (enabling) and blocking mechanisms (including regulative), the nature and scale of their impacts and recommendations for improvement.
- Step 6: Specify key issues to be addressed and policy and planning responses (lessons and guidelines) i.e. (contextual) influences that have served to determine case study project strengths and weaknesses. Identification of generic & context-specific lessons, guidelines and policies to enhance: the retrofitting of existing projects, and; the delivery of new projects.
- **Step 7:** Dissemination of MUTP lessons and guidelines.

In discussions with Partners at the OMEGA Lund Workshop, it became clear that further refinements to the approach would be needed, so as to provide a more in-depth assessment of the tasks required to complete the synthesis work – while retaining the key principles associated with the Bergek et al framework as these were seen to resonate strongly with the OMEGA research (especially in regard to the treatment of MUTPs as innovation systems).

The refinements were shared with the VREF Scientific Committee in May 2009 via a paper entitled – 'Outline methodology for completion of OMEGA research programme with emphasis on methodology to undertake the comparative analysis and synthesis of case studies and arrive at derived lessons and guidelines for stakeholders of mega urban transport projects (MUTPs)', May 2009 (see Appendix 9) and were discussed in detail with the above-mentioned VREF representatives in June 2009. The refinements essentially represented further adaptations of the Bergek et al framework which were seen to be required in order to:

- provide outputs that would enable the OMEGA Centre to respond to the research programme's three Overall Research Questions (ORQs) and three Overall Research Hypotheses (ORHs);
- provide a framework that demonstrates a logical 'flow' of analytical work that is clearly focused and manageable, given that the bulk of the synthesis work was to be undertaken by the Centre Team alone;
- enable the application of quantitative, qualitative and mixed-method analytical techniques, and;
- perhaps most importantly, to provide a process capable of ultimately producing lessons that emanate from the research programme findings that have clear resonance with key MUTP stakeholders (and 'practitioners').

This more fully elaborated approach to the comparative analysis and synthesis of the various case study and country findings is shown by Figure 1.2. It comprised seven key steps, as follows:

- **Step 1:** comprising outputs from the Country Synthesis Reports covering all 27 case studies.
- Step 2: entailing the scoping (compare and contrast) of patterns of knowledge associated with: the ORQs and ORHs, the treatment of MUTP sustainability visions and challenges and the treatment of risk, uncertainty, complexity and context (RUCC) in MUTP decision making.
- **Step 3:** involving the plotting of emergent patterns of responses to ORQs and ORHs and the treatment of sustainability visions and challenges, as well as, RUCC against selected pre-identified contextual typologies.
- **Step 4:** comprising the scoping of other emergent contextual typologies.
- **Step 5:** entailing the 'sensemaking' analysis and synthesis of typological influences and patterns of knowledge.
- Step 6: involving the preparation of generic and context-specific lessons & guidelines.
- **Step 7:** comprising the dissemination of lessons and guidelines, assigned to key stakeholder (practitioner) targets where appropriate.

1.3 Currently adopted synthesis methodology

The methodology ultimately adopted by the OMEGA Centre for the compare and contrast synthesis of UK and international case study and country findings is shown by Figure 1.3. It is considered that this retains the bulk of the methodological principles established earlier in relation to the Bergek et al approach, its adaptation to the OMEGA research programme and its subsequent refinements. The synthesis methodology shown by Figure 1.3 predominantly refers *only* to the latter part of the Bergek et al framework (i.e. Steps 4b to 6 – see above and Figure 1.1). However, the adopted methodology does represent a necessary adjustment to the previously proposed approach shown by Figure 1.2 – the reasoning behind this revision is variously explained below.

With reference to Figure 1.1, the current synthesis methodology sought to embody most of the same principles as the methodology discussed with VREF representatives in June 2009. As before, the currently adopted synthesis methodology is represented by seven principal steps, as follows:

- **Step 1:** comprised outputs from the Country Synthesis Reports covering all 27 case studies i.e. no significant change from previous version.
- Step 2: entailed the scoping of patterns of knowledge associated with: the ORQs and ORHs, the treatment of MUTP sustainability visions and challenges and the treatment of RUCC in MUTP decision making i.e. no significant change from previous version. Particular attention was paid in this Step to extracting context-specific responses to each ORQ and ORH at the case study level and country level (which are reported in Volume 3 and Volume 4 of this Report under each country and case study level and country level. The latter were then taken forward as the foundation for a compare and contrast analysis and synthesis in Step 3.
- Step 3: involved the plotting of patterns of generic responses to ORQs and ORHs and the undertaking of a compare and contrast analysis and synthesis based thereon. This analysis and synthesis commenced with the plotting of responses drawn from the UK case studies, clustered by common themes and topics. The principal task was then to determine the degree of resonance with the UK findings that could be detected in relation to the international findings associated with each set of responses to the ORQs and ORHs. Emergent/new patterns of responses that represented a distinct divergence from the UK findings were also identified in this Step. This Step is also further explained in the introduction to Section 5 (below). Thus, for reasons discussed in paragraph 1.4 (below), this Step represents an adjustment of the synthesis methodology shown by Figure 1.2.
- Step 4: comprised the extraction of stated lessons from all completed case studies and Country Summary Reports covering such matters as the treatment of RUCC and sustainable development visions. These UK and international lessons were informed by the '4 tests' analyses as well as responses to the ORQs and ORHs, and comprised those of a generic and context-specific nature. Again, for reasons given in paragraph 1.4, all lessons that were seen as essentially context-specific are reported in Volume 3 (UK) and Volume 4 (International) and were not taken forward for the compare and contrast analysis and synthesis unless distinct common patterns were detected. Clearly, this procedural Step represents something of a departure from the previous synthesis methodology discussed with VREF representatives in June 2009 (Figure 1.2) which sought to identify emergent typological influences again, the reasons for this divergence are explained in paragraph 1.4 (below).
- **Step 5:** involved the conducting of a compare and contrast analysis and synthesis of the generic lessons identified/plotted in Step 4, principally to detect/confirm common patterns from amongst the wide variety of MUTP types and country contexts under examination. A particularly important input to this Step comprised were the Principal Themes and Lessons associated with MUTP planning, appraisal and delivery extracted

from the OMEGA 1 Project, which provided an appropriate and most useful framework on which to cluster the potentially generic lessons (see also Section 4 below). This Step thus represents a further departure from the synthesis methodology shown by Figure 1.2, again for reasons explained in paragraph 1.4.

- Step 6: involving the preparation of generic lessons based on the output from Steps 1-5. In substance, this is similar to the previous Step 5 shown by Figure 1.2. However, for reasons given in paragraph 1.4 (below) it was: deemed not appropriate to offer 'guidelines' or 'policy responses' (which are considered to be too context-sensitive); not possible to complete an analysis and synthesis of blocking and inducement mechanisms, and; considered that the large number of context-specific lessons are best located under their respective countries and case studies in Volume 3 (UK) and Volume 4 (International) in light of their potentially high sensitivity to 'context'.
- Step 7: comprising the dissemination of lessons and guidelines, assigned to key stakeholder (practitioner) targets where appropriate i.e. no significant change from previous version.

1.4 Comparison of current methodology and previous versions

Comparison of the frameworks shown by Figures 1.1 (Bergek et al, 2008) and 1.3 (current framework) clearly shows that:

- Steps 1-4b in the Bergek et al framework resonate very strongly with the synthesis methodology that was ultimately adopted;
- Steps 5-7 in the Bergek et al framework have been adopted in essence, but with some further necessary modifications (explained below).

Similarly, comparison of Figures 1.2 (the synthesis framework discussed with VREF representatives in June 2009) and 1.3 (the current framework) demonstrates that the key features of the former were retained by the OMEGA Centre. However, again, a number of modifications had to be made in light of both the availability/coverage of data received from Partners and by virtue of some key early findings that dictated (in particular) which of the seven Steps shown in Figure 1.2 could/could *not* be completed in the prescribed manner. These modifications are explained below.

1.4.1 Lessons, guidelines and policy measures

The frameworks shown by Figures 1.1 and 1.2 both refer to the preparation of lessons, guidelines and policy measures. Reflecting on this, the OMEGA Centre considered that providing generic and context-specific guidelines and policy measures for decision-makers requires a depth of knowledge of *each* country and temporal context represented by the OMEGA network that no one body, group or individual could possibly possess. Thus, the Centre has focused on the provision of generic 'lessons' that are seen as capable of *informing* the work of decision-makers and other stakeholders in conducting MUTP planning, appraisal and delivery.

Figure 1.1: Bergek et al framework adapted to OMEGA research programme



Figure 1.2: Synthesis framework discussed with VREF representatives in June 2009



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Figure 1.3 : Overview of adopted synthesis framework of UK and international case study findings



1.4.2 Generic and context-specific lessons

As shown by Figures 1.1 and 1.2, the original intention was to synthesise both contextspecific and generic responses to ORQs and ORHs and proffered lessons. However. having examined the contents of the international case study findings (and the Country Summary Reports), it was concluded that many of the responses to ORQs an ORHs and lessons put forward are so sensitive/relevant to particular locational, economic, cultural, institutional and other contexts that their synthesis would not be fruitful (and might indeed be highly suspect) without further study. Instead, such findings are reported in Volumes 3 and 4 (regarding OMEGA UK and international case studies, respectively) as a key body of evidence of lessons learned which will undoubtedly be most useful to decision-makers in each country context. However, common patterns of knowledge that were detected from these context-specific findings were used to inform and support the formulation of the generic lessons outlined in Section 6. Thus, the bulk of the synthesis work here in Volume 5 refers to observed generic responses to ORQs and ORHs and generic lessons which resonate strongly amongst case study projects and countries represented in the OMEGA network.

1.4.3 Blocking and inducement mechanisms

The assessment of blocking and inducement mechanisms was intended to be a feature of the synthesis methodology as shown by Figures 1.1 and 1.2. In the event, it was found that the overall research findings did *not* explicitly address this matter in a sufficiently comprehensive manner to enable useful conclusions to be reached. This aspect warranted further discrete attention (given that the submissions by OMEGA Partners provided only a rather patchy account of blocking and inducement mechanisms in each (international) country context). However, key findings associated with such 'blocking' mechanisms as incomplete institutional frameworks and lack of clearly defined sustainable development visions and policies, *are* reflected as appropriate in Sections 5 (responses to ORQs and ORHs), in Section 6 (generic lessons) and in Section 7 (lessons for decision-makers).

1.4.4 Typologies

Another necessary modification to the synthesis methodology that arose concerns the original intention to position both responses to ORQs and ORHs and lessons by MUTP typology. Here, it had been envisaged that the synthesis would encompass the use of typologies such as project raison'd'etre, financing method and project type (road, rail, combination etc.) to demonstrate that certain types of responses and lessons are appropriate to certain typologies (or 'strings' of typologies). However, ultimately this proved not to be possible, for essentially two reasons: Firstly, the Centre Team simply had insufficient time to do full justice to such an analysis - not least because, subsequent to the OMEGA Perth Workshop in July 2011, further key information is awaited from Partners at the time of compiling this Final Report, as well as a Sensemaking Report from Cognitive Edge Pty. Secondly, it became clear after undertaking the initial synthesis work that there are *inherently* fewer typological differences at play in relation to the responses to ORQs and ORHs and lessons than was originally anticipated. However, where such typological influences do appear to be relevant (e.g. in relation to project financing methods, especially PPPs and PFIs), this is reflected in Sections 5 (in Responses to ORQs and ORHs) and 6 (Generic Lessons).

1.4.5 Approach to synthesis of responses to ORQs and ORHs

As noted above, and in Section 5 (below), the overall synthesis of responses to ORQs and ORHs is based upon determining the degree of resonance that exists between UK OMEGA

case study findings and those of the international OMEGA case studies. This was *not* envisaged in the originally proposed approach but was made necessary as a result of the need to 'sensemake' patterns of knowledge from a very large body of evidence submitted by Partners – using the UK case study findings (which were rather more developed) as a mode of entry to the synthesis of this wealth of information proved to be a very useful (and pragmatic) approach. Notwithstanding this, any new/emergent patterns of responses not reflected in the UK findings *are* identified in Section 5.

1.4.6 OMEGA 1 Project inputs

A refinement to the synthesis methodology introduced by the Centre Team in 2011 comprised the use of Principal Themes and Lessons extracted from the OMEGA 1 Project². In fact, the OMEGA 1 Project findings had previously been input (for example, in relation to the '4 Tests' analyses of the treatment of risk, uncertainty, complexity and context), but it was *also* considered to be critically important to draw upon these earlier findings as a means to: firstly, identify key *themes* associated with MUTP planning, appraisal and delivery around which could be clustered the generic lessons generated by the synthesis stage (see Section 4 below), and; secondly, to reiterate those key lessons emanating from the OMEGA 1 Project which inform, resonate with, and amplify the generic lessons emerging from the OMEGA 2 work. It is thus considered that the addition of the OMEGA 1 Project findings has significantly enhanced the synthesis stage.

² OMEGA Centre. 'The OMEGA 1 Project: Treatment of risk, uncertainty and complexity in planning by other disciplines and professions'. September 2008

2. Compare and contrast analysis and synthesis of four test findings: Some qualitative and quantitative observations

2.1 Test 1: Meeting project Objectives

2.1.1 Project costs/budgetary objectives³

The average final cost of an MUTP from the OMEGA sample of projects was 4.63 bn US Dollars (at 2010 prices) compared to an average cost *at project ratification* of 3.79 bn US Dollars (again, at 2010 prices) – suggesting an average cost-overrun of 22%. As shown in Figure 2.1 below, 15 of the 30 OMEGA MUTPs studied were over budget by more than 10%, when comparing the final cost to the cost estimate at the time of their official approval⁴.



Figure 2.1 : Number of OMEGA projects with cost overruns

The distribution of project costs and of cost overruns is sufficiently variable to produce significant differences between the 'global average' cost overrun quoted above and the mean project cost overrun of 19% (the latter representing the average of the percentage cost overruns experienced on each of the individual 30 projects. The median cost overrun, however, was only 10%, which suggests that both the global average and the mean quoted above were slightly skewed by the inclusion of several projects that were both unusually expensive and experienced unusually high cost overruns. In the Flyvberg sample of 258 projects drawn worldwide from secondary sources between 1927 and 1998 (Aalborg University Study), actual costs were on average 28% higher than estimated costs, with *no* significant improvement over time (Flyvbjerg et al, 2003)⁵. However, because Flyvbjerg et al

³ All costs have been adjusted to 2010 USD, using historical inflation rates from <u>www.indexmundi.com</u> and the exchange rates current on 15 December 2010. Note: percentages in this section, including percentages of the total number of case study projects, are rounded up or down to whole numbers for ease of reading.

⁴ Figures for the M6 Toll in this graph relate to construction only and estimated cost data are unofficial.

⁵ It should be noted that the project statistics that were cited by Flybberg in this study were extracted from a variety of sources over a period of about 70 years, including from the World Bank and contained a mixture of projects from both the Developing World and the Developed World. Whereas, the estimates offered by the OMEGA research programme are confined to projects in the Developed World and are drawn from projects since 1990 and 2009, i.e., over a period of almost twenty years.

(2003) note that cost overruns are more pronounced in developing nations this may account for the difference in figures between those observed from the OMEGA projects.

Figure 2.2 below presents the number of OMEGA MUTPs with cost over-runs split by mode type. The figure shows that two of the three projects identified as 50%+ over budget are road projects. Out of the 15 projects which were no more than 10% over budget, 6 of these were road projects (60% of all road projects studied), three were metro projects (50% of all metro projects studied), 5 were heavy rail (50% of all heavy rail projects studied) and 1 was a combination project⁶ (25% of all combination projects studied). Therefore, road projects had the highest percentage of projects studied which were no more than 10% over budget.



Figure 2.2 : Number of OMEGA MUTP projects with cost overruns

Figure 2.3 shows the relationship between MUTP cost over-run and project completion year post 1990. The plot shows there is little correlation between the two variables. There is *no* evidence to suggest projects have become either more or less on-budget over time.

Figure 2.3 : OMEGA project cost over-run plotted against year of completion



⁶ A project involving both road and rail infrastructure

Project typology analysis of MUTP cost overruns does *not* show any significant distinctions between modes of transport, geographical function or indeed construction type. However, Figure 2.4 below shows projects featuring a small number of nodes⁷ are more likely to be completed under budget than those with a large number of nodes, whilst projects with a large number of nodes are more likely to be significantly (26% or more) over budget than projects with a small to medium number of nodes.



Figure 2.4 : OMEGA MUTP cost over-run plotted against number of project nodes

Figure 2.5 shows the most common reason for MUTP cost overruns were changes to the project scope and/or objectives *subsequent* to the commencement of its planning. This affected 37% of the projects studied. This observation reinforces findings elsewhere in the OMEGA research programme that reveals MUTPs are in constant flux during their planning phase, especially, and that such changes have a significant impact on the ultimate projects, their cost being one such impact.

Again from Figure 2.5, one may note that 20% (12) of the 30 MUTPs studied attributed project cost overruns to a combination of factors, including: the inaccuracy of initial cost estimates, mitigation of environmental impacts and rising costs such as construction costs. These three causes are closely linked, with two of them being a sub-set of the third. They have, however been broken down and reported on here to indicate the fuller set of explanations given by respondents to the OMEGA research. Conflicts between stakeholders caused conflicts in six cases, ranging from acrimonious client-contractor disputes to complex co-ordination between multiple agencies, to tacit opposition by local planning authorities and industrial action by construction workers. Five projects encountered cost overruns due to the influence of contextual *events* such as the 2004 Athens Olympic Games and the Millennium, as well as extreme weather conditions and changes in economic circumstances (to an economic recession).

⁷ Nodes were counted as stations for rail project and junctions for road projects



Figure 2.5 : Reasons for OMEGA MUTP cost overruns

Figure 2.6 below presents a spider graph of reasons for MUTP cost over-runs broken down by project mode. It would appear for heavy-rail projects these are *most* sensitive to changes in project scope, stakeholder conflicts and environmental mitigation. This may reflect the often political nature of such MUTPs.





Figure 7.7 shows most MUTPs reviewed cost less than US\$ 0.5bn (2009 prices) per kilometre, where these are essentially line-haul projects. The most expensive projects tended to involved a high level of technical complexity. For example, the costs for the Tiergarten Tunnel include construction of the Berlin *Hauptbahnhof*, one of the largest train stations in Europe (but excludes the road tunnel built as part of the project). Furthermore four out of the five projects with the highest cost per km are tunnel projects. Interestingly, of the five least expensive MUTPs per km, three are heavy or high speed rail projects, the other two being roads.



Figure 2.7 : OMEGA MUTP out-turn cost (in 2010 US\$ bn) per km

2.1.2 OMEGA MUTP Programmes⁸

Figures 2.8 to 2.10 below outline the temporal distribution of three key stages in the project life cycle for the 30 MUTP case studies.











Figure 2.10 : Project Completion

1950-4 1955-9 1960-4 1965-9 1970-4 1975-9 1980-4 1985-9 1990-4 1995-9 2000-4 2005-9

The figures illustrate that although the projects where all delivered in a relatively narrow period of time after 1990 (this is to be expected as the OMEGA case study selection criteria

⁸ In this analysis, the "planning" period is defined as starting with a definite commitment to the project by a government decision-making or implementing agency and ending with the start of construction; and the "construction" period ending with the start of operations or opening date (and so includes testing periods which can also involve delays, as on the *Randstadrail*). Where periods of inactivity lasting several years or more separate the planning process from an earlier process involving an essentially different project, the earlier process has been counted as part of the pre-planning stage.In some cases planning and/or construction took part in sections – data for the largest or longest section have been used (e.g. Meteor, ICE).

requested all projects to be studied should be completed post 1990), their ratification date and conception dates, in some cases, span over considerable periods of time.

In many cases, a lengthy 'precursor' stage of contextual events and abortive proposals can be identified. Some MUTPs, for example, were shelved for lengthy periods *before* final approval due to earlier unsupportive governments. In other instances, they were either totally abandoned or significantly revised, with different versions later being resurrected. These periods for the 30 OMEGA case studies reviewed are shown in Figure 2.11 below. Here one may note that eight of the 30 MUTPs reviewed (i.e., approximately 25% of the projects) were in the pipeline for 20 or more years *before* their planning period even started. These were the Melbourne CityLink, NBS Cologne-Rhine/Main high-speed rail line, Rion-Antirion Bridge, Athens Metro, Attiki Odos, Sodra Lanken, New York Airtrain, Jubilee Line Extension.





Figure 2.12 below shows the planning periods for the 30 OMEGA MUTPs reviewed (including periods prior to appraisal). Once underway, the project planning periods varied between three and 15 or more years. Half of the projects spent over 9 years in the planning phase (the mean planning period was 119 months [9.9 years], the median 108 months [9 years]).

Figure 2.12 : Number of OMEGA MUTPs with long planning periods



Figure 2.13 below shows the construction periods for the 30 MUTPs reviewed. The figure reveals that half of the projects spent over five years in construction. What is interesting to note is that the average construction period was slightly over half that of the average planning period (the median construction period being 66 [5.5 years] months and the mean 81 months [6.75]).



Figure 2.13 : Number of OMEGA MUTP with long construction periods

Figure 2.14 shows the combination of planning and construction periods for the 30 MUTPs reviewed. The shortest combined planning and construction period was just under eight years, the longest over 37 years. Half the projects took over fifteen years to complete (the median period was 178 months (14.8 years), , the mean 199 months (16.5 years). MUTP programmes last a significant length of time considering the average duration of government administration (between 1945 and 1998) was found approximately 1.6 years⁹ and the average length of a credit boom in an industrial country (from 1960 to 2000) was around 7 years¹⁰





⁹ If G analysis of data from Woldendorp, Keman and Budge, Party government in 48 democracies (1945-1998), p. 79.

¹⁰ Mendoza, E.G and Terrones, M.E (2008) "An Anatomy Of Credit Booms: Evidence From Macro Aggregates And Micro Data" NBER Working paper No. 14049, The National Bureau of Economic Research, Cambridge, MA.

Figure 7.11 below shows the number of years of delay experienced by the 30 OMEGA MUTPs reviewed. Two-thirds of the projects (i.e 20) were behind schedule in delivery, with a third (i.e., 10 projects) being over two years late. The mean delay was 19 months, the median 12 months. Significantly, 30% (i.e. 10 of the projects) reviewed were either ahead of schedule or on time. Flyvbjerg et al (2003) do not deal extensively with the subject of project delay, but note the view that private projects involve penalties for time overruns, and quote an average delay of seven months for private projects. This suggests that the inclusion of public sector projects significantly worsens the performance of projects in terms of delivery time (*discussed further under typology below*).



Figure 2.15 : Number of OMEGA MUTPs behind schedule

Analysis of the occurrence of delays by MUTP typology shows a significant cluster of road projects completed *ahead* of schedule. Conversely, rail projects reviewed seem more likely to suffer longer delays (Figure 2.16).



Figure 2.16 : Number of OMEGA MUTPs behind schedule by mode type

25

The bars shown in Figure 2.17 represent the number of projects with varying percentages of public sector funding from 0% to 100% using 4 divisions. The red shading shows the number of projects completed *on time* within each of these divisions. The blue shading shows the number of projects *delayed*. It appears there is a tipping point at 25% public sector funding. Those projects containing more than 25% public funding are delayed 50% of the time, whilst those projects with less than 25% public sector funding are delayed only 10% of the time.



Figure 2.17 : OMEGA MUTP funding plotted with project delay



Figure 2.18 shows the causes of delay identified by the research. Funding difficulties were the most widely identified causes of MUTP delay. These were cited by 40% (12) of the 30 projects reviewed. Political developments (such as changes in government) were the second most widely identified cause for project delay, cited by 33% (10) of the projects reviewed. Contrary to widespread expectations perhaps (if one is to believe many media reports), managerial issues were identified as one of the *least* common causes of project delay. This, the OMEGA Team conclude, *must* be acknowledged as an indirect tribute to the international MUTP managerial profession. It is interesting to note the contrast between the reasons cited for MUTP cost overruns (figure 2.5) and project delays (figure 2.18 below). Somewhat contrary to urban myth, political developments and funding difficulties are *not* cited as the principal reasons for cost overruns as they are for delays. In many cases, political developments, such a change in the ruling party, caused projects to be temporarily abandoned or created complications in securing approval. In some cases they are also reflected in the changes in project scope and/or objectives that is cited as a major cause of cost overrun.



Figure 2.18 : Causes of OMEGA MUTP delay identified

Rail MUTPs are most likely to be delayed by funding difficulties and political developments; whereas road projects are more likely to be delayed by political developments and public opposition. For metro and light rail projects, funding difficulties and changes in project scope are the most common causes of delay (see Figure 2.19).





2.1.3 MUTPs as agents of change

Figure 2.20 below shows the types and occurrence of associated developments in relation to the OMEGA MUTPS studied, whereas, Figure 2.21 shows the occurrence of associated development type, split by transport mode. The rail-based MUTPs reviewed are associated with three distinct types of development. These are: 'station based development', 'hub development', and 'associated regeneration project'.

The construction or refurbishment of facilities (and in some cases associated residential and/or commercial development in the immediate vicinity) at key transport nodes was planned and/or financed as an explicit part of 47% of the projects. As these nodes are most commonly rail or metro stations (blue and red shading in Figure 2.21) and this form of development is rarely associated with road projects, it is categorised here as 'station based development'.

Half of the projects (i.e. 15) have been associated with a more dispersed patterns of residential and/or commercial development over a wider area surrounding some or all of the principal nodes. This category of 'hub development' does *not* form an explicit part of the project or of associated projects, but is assumed to arise at least in part as a response to the increased accessibility and connectivity provided by the project. Again, this occurs most commonly with rail projects (blue shading in Figure 2.21), although it is also the most frequent form of development associated with road projects.

Less common (occurring in 37% of cases) are specific urban 'regeneration projects' or initiatives associated with the MUTP and focused around key nodes. This category is also more commonly associated with rail than road projects.



Figure 2.20 : Frequency of associated OMEGA MUTP development (% of total number of projects)



Figure 2.21 : Associated OMEGA MUTP development by mode (% of total number of projects)

2.1.4 Original MUTP objectives: number and type

In the following paragraphs, the principal stated objectives of the 30 MUTPs reviewed have been grouped into generic categories to facilitate analysis (see Figure 2.22 and table 1 below). The most common (featuring in 18 of the 30 projects), are the aims: "to improve network efficiency" (for example, by contributing a key link within a wider transport infrastructure network), "to relieve traffic congestion" or "to increase transport capacity". It should be noted that these principal objectives are *all* tied to aspirations of increasing transport operations efficiency rather than enhancing transport development impact and/or any broader agent of change aims. "Travel time saving" is an explicit objective of 12 of the 30 projects but may be also implicitly incorporated within aspirations at improving network efficiency or relieving traffic congestion in other projects. These three objectives are all mutually reinforcing. A related objective is "to encourage mode shift" (usually away from road and/or air travel towards more sustainable public transport modes).



Figure 2.22 :Occurrence of original MUTP objectives

Objective Name	Definition
Economic sustainability (internal)	Internal objectives such as providing the infrastructure at no cost to the public sector, making a profitable return
Use new technology	Using the process of building the project as an opportunity to experiment with, or demonstrate, emerging technological solutions
Political objectives	Using the project to deliver a specific political agenda, such as providing an opportunity for private sector actors to enter the market
Social objectives	Using the project to deliver social objectives such as improved safety or specific local employment creation
Improve local environment	Eg by reducing noise and air pollution in the local area created by road traffic, improving landscaping and pedestrianisation
Support economic development	Eg facilitating greater trade between two areas by making transport quicker and more efficient and/or reliable
Local regeneration	Eg linking the project to property developments or architectural projects on a local scale
Improve accessibility	le improving transport links / services to existing urban areas
Support urban development	le improving or providing transport links / services to planned new urban developments
Strategic transport link	le providing transport links to a port or airport, or across a body of water
International links	le providing transport links across national boundaries
Regional/national transport link	le providing transport links between two regions and/or major cities within a country
Encourage mode shift	le encourage travellers to use a different mode of transport for their journey
Travel time savings	le reduce the amount of time taken to complete a specific set of existing journeys
Improve network efficiency	le provide links or new services which help to optimise the functioning of an existing network
Relieve congestion	le relieve congestion on an existing network or piece of infrastructure (generally either by providing additional capacity or improving network efficiency, or a combination of both)

Table 2.1: Definition of aggregated OMEGA MUTP objectives

The objectives of seven of the MUTPs reviewed included objectives of "providing a regional / national transport link" and a further seven (claim to) provide an **international transport link**. Nine of the 30 MUTPs declared aims to "provide a *strategic* transport link (to a port or airport, or across a body of water), while improving access to an airport was an *explicit* objective of seven projects. Overall, however, as may be appreciated from the data presented in Figure 7.16, the most frequently cited objectives addressed concerns of transport operations efficiency that often ultimately collided with other agent of change objectives or aspirations of enhancing sustainability.

Notwithstanding this, some of the MUTP objectives did emphasise the relationship between transport and land use, and indirectly inform their impact on sustainability outcomes. Of the 30 MUTPs reviewed:

- 11 explicitly stated they sought "to support urban development in a specific area" (for example, where they are designed to provide transport links to new and emerging residential areas);
- 12 projects aim "to improve accessibility" in areas that are already well developed but have relatively poor transport connections;
- seven projects aim "to help facilitate specific local regeneration initiatives"; and
- 12 projects aim "to support economic development" more generally (for example, by enhancing the competitiveness of a region).

A related objective of 12 MUTPs is "to improve the local environment". This sometimes takes the form of an explicit part of the project or a related project, as in the case of using the reconfiguration of the road network as an opportunity to introduce pedestrianisation in central areas, an explicit objective for both Melbourne City Link and Sydney Cross City Tunnel.

The final group of objectives encompasses a broader range of socio-political aspirations. It is probably fair to say that MUTPs provide an important opportunity for these wider objectives to be pursued, and yet they do *not* form the principal rationale for the project. They include the aim to promote "the use of new technology" to contributing to social objectives such as "improving safety" and to "enhancing political objectives and opportunities", including the promotion of ideological aspirations such as encouraging private sector involvement and competitive practices in transport infrastructure and service provision. The latter *could* be seen as part of the wider aim of moving toward greater institutional sustainability, in the sense that it is motivated by an aspiration to develop new ways of working and to establish new public-private partnerships for long-term operation and maintenance.

This confusion (and conflict) at the heart of MUTP appraisal between wider agent of change objectives and transport performance objectives is especially important when the real and ultimate purpose (implicit or otherwise) of MUTP developments is to significantly contribute to objectives outside the transport sector and when the formal conventional measures of 'success' are transport operations efficiency based. This dichotomy was most evident in the case of the Big Dig project.

Figure 2.23 below shows the number of project objectives per project. It is Interesting to note the high incidence of projects with large numbers of objectives: half (15) have 8 or more objectives.





Figures 2.24a to 2.24d below show the original objectives split by project type. For road projects, the most common objectives are "to relieve congestion and improve the local environment". The most common objective for rail projects are "to improve network efficiency, and encourage modal shift". For metro projects, being a sub-classification of rail it also has improving network efficiency as their most common objective. However, their second most common objectives are "to increase accessibility and reduce congestion". Overall the non-road type projects display a more balanced spread of objectives and are more likely to encourage mode shift.

Figure 2.24 : Occurrence of original OMEGA MUTP objectives split by project type NUMBER OF ROAD PROJECTS FEATURING THIS OBJECTIVE NUMBER OF RAIL PROJECTS FEATURING THIS OBJECTIVE



NUMBER OF COMBINATION PROJECTS FEATURING THIS OBJECTIVE





0



2.1.5 Emergent project objectives: number and type

Figure 2.25 reveals the explicit identification of 'emergent objectives' among the 30 MUTPs reviewed. The acknowledgement by OMEGA Partners of these emergent objectives among the MUTPs reviewed was significantly less than in the case of the objectives set out by project promoters from the outset, identified only in ten of the 30 projects. In the case of five projects, the opportunity "to improve accessibility to specific areas" emerged during the planning and appraisal process, sometimes in concert with related opportunities "to improve the local environment" or "to link to local regeneration projects" or "to support urban development." Developments in the political context of MUTPs spawned several new emergent objectives: for example, one project (the CTRL) became "a strategic transport link" as a result of a mega-event (the London Olympics), while another (Sweden's Sodra Lanken) was intended to support urban development linked to a mega-event (Hammarby Sjöstad, originally intended to be the Athletes Village should Stockholm's bid for the 2004 Olympic Games be successful).





■ NUMBER OF PROJECTS FEATURING THIS OBJECTIVE

2.1.6 **Project achievement relevant to original and emergent objectives**

Figure 2.26 below shows the percentage of principal objectives that were seen by OMEGA Partners to be achieved by the MUTPs reviewed. Almost two thirds of projects achieved at least 50% of their objectives (the mean rate of achievement being 57%).



Figure 2.26 : Percentage of OMEGA MUTP objectives achieved

Figure 2.27 shows the perceived achievement of objectives by OMEGA Partners distributed by project. When reviewing the achievement of objectives, Partners found that in many cases objectives had been only partially achieved, or that there was a lack of knowledge about whether the objectives had been achieved.



Figure 2.27 : OMEGA MUTP objectives achieved by project

Figure 2.28 gives a breakdown of achievement by project objective. The most widely satisfied objectives were the use of new technology, to provide a strategic transport link and to improve accessibility. It could be argued these project objectives are satisfied simply by the realisation of the physical infrastructure.



Figure 2.28 : Achievement of principal OMEGA MUTP objectives by objective

Reviewing achievement levels by objective suggests several key lessons:

- Transport-related objectives such as relieving congestion and providing travel time savings are relatively simple to achieve (however, in several cases congestion relief proved to be temporary), although mode shift seems the most difficult to achieve amongst this group (this may be because it is the most affected by external context, for example the existence of complementary policies affecting the use of other modes).
- Objectives related to land use development, by contrast, seem difficult to achieve
 or even to measure. This is particularly the case for the objectives of supporting urban
 and economic development: in some cases, the project's contribution to these wider
 aspirations is either not understood or not subjected to any ex-post evaluation. In other
 cases, the failure or partial failure may be associated with a lack of progress on the
 planned development rather than with the project per se.
- The objective of improving accessibility to existing areas is achieved in most cases. This is the case since this is primarily dependent on improving the transport service.
- Local regeneration objectives are also achieved or partially achieved in the majority of cases. This is, perhaps because they are more narrowly site-specific objective than encouraging urban or economic development on a larger spatial scale.

Of the third category of objectives, the use of new technology is always achieved because it is a decision internal to the project, whereas economic sustainability is rarely achieved as it requires the control of costs and schedules, which are affected by external contextual factors. Political objectives often relate to the use of new public-private delivery mechanisms within the project and so are more easily achieved than social objectives, which are more likely to be aspirational and involve an impact on the external context.

The conclusion of this section is that a distinction (although not an absolute one) can be made on the one hand between objectives that are internal to the project and those within the sphere of responsibility of the project promoters, and on the other hand between those that involve an impact upon the external environment. This distinction could be mapped onto the distinction between 'simple' and 'complex' projects, with the implication that objectives for 'simple' projects are relatively easy to achieve, whilst objectives for 'complex' projects are not.

2.1.6.1 Achievement of 'emergent' objectives

Levels of achievement are significantly higher for emergent objectives than for objectives set at the outset of the project. This suggests that, if new objectives are set during the evolution and planning of an MUTP, they are more likely to reflect a new understanding of the prevailing project contexts (of all kinds) or an enhanced level of commitment to achieving the newly adopted objective. This could be a powerful argument in favour of the premise advocated by some that MUTPs need 'time to breathe' and should not be forced to speed-up their delivery. Another possible explanation for this higher achievement level among emergent objectives is that it represents a form of post-rationalisation.



Figure 2.29 : Achievement of emergent OMEGA MUTP objectives

2.1.7 Summary of key findings from Test 1

Project cost objectives: The average final cost of an MUTP from the OMEGA sample was 4.65 Bn US Dollars (at 2010 prices) compared to an average cost at ratification of 3.79 Bn US Dollars (at 2010 prices). Assuming all projects within the OMEGA project sample aimed to complete within the forecast budget at the time of the official approval of the project, only 33% achieved this goal. Only half of the projects completed with a budget over-run of 10% or less. These figures appear poor, however the average cost over-run for the 30 OMEGA case
studies was found to be 19% which is 9% lower than the average cost over-run found by the Flyvbjerg et al study conducted in 2003. From the OMEGA study road projects were found to be the most commonly under budget. The most common reasons cited for cost over-runs were changes in project scope or objectives, followed by rising construction costs.

Project programme: Only 33 percent of the OMEGA study sample completed construction on or ahead of schedule. A significant cluster or road projects finished ahead of schedule, whilst rail projects seemed more likely to suffer longer delays. The two most cited reasons for project delays were funding difficulties and political developments. An analysis of funding sources found that projects with more than 25% public funding are delayed 50% of the time, whilst those projects with less than 25% public sector funding are delayed only 10% of the time.

Project objectives and achievement of objectives: the most frequently cited original objectives addressed concerns of transport operations efficiency that often ultimately collided with other agent of change objectives or aspirations of enhancing sustainability. The study of objectives also revealed the explicit identification of 'emergent objectives' among the 30 MUTPs. The most common emergent objective was "to improve accessibility to specific areas", sometimes in concert with related opportunities "to improve the local environment" or "to link to local regeneration projects" or "to support urban development.".

Concerning achievement of objectives: almost two thirds of projects achieved at least 50% of their objectives, however only 3 projects were found to achieve all stated objectives. Levels of achievement are significantly higher for emergent objectives than for objectives set at the outset of the project. This suggests that, if new objectives are set during the evolution and planning of an MUTP, they are more likely to reflect a new understanding of the prevailing project contexts (of all kinds) or an enhanced level of commitment to achieving the newly adopted objective.

2.2 Test 2: Sustainable development visions and challenges

The following is a synthesis of Test 2 returns responding to the 4 Tests Guidance Note (CD ROM: <u>OMEGA Guidance Notes\OMEGA2 Guidelines-4 Tests Guidance Note for</u> Partners PW 23-7-09.doc) as provided to partners in July 2009.

2.2.1 Addressing sustainability concerns: Projects achievements

A principal finding from a study of Test 2 documents prepared by the various OMEGA Partners was that 74% of the 30 MUTPs were not formulated according to sustainable development principals as defined by the OMEGA study (see Figure 2.30 below). Only 7% of case studies were judged to have been conceived with sustainability in mind. On the basis of these findings, the majority of the OMEGA Case Studies can therefore *only* be evaluated against concepts of sustainability that were developed *after* their formulation and in this regard reflect more which of such projects now represent candidates for retrofitting to meet new goals of sustainable development.

Figure 2.30 : Pie Chart showing % of MUTP case studies reported as formulated according to sustainable development principles



Despite the lack of sustainable development principals prevalent during the planning stages of the 30 MUTPs reviewed, the majority (96%) undertook Environmental Impact Assessments (EIA) as shown in Figure 2.31 below. The focus of such EIAs was, however, according to OMEGA Partners, seen as too narrow in terms of the breath of issues covered. In particular, their limited applicability to the project life-cycle beyond the construction phase was criticised, as was their limited input into the early MUTP decision making process, and the questionable rigour in which they were undertaken.





Figure 2.32 below shows an analysis of the stage in the project life cycle when the EIA was undertaken for each of the 30 OMEGA MUTPs. Only 23% of these projects included EIAs which were identifiable as undertaken during the project conceptual stage – considered the point at which an EIA's outcome has the greatest potential for a positive impact on a project's decision making.



Figure 2.32 : Analysis of stage in MUTP life cycle when EIA undertaken

Figure 2.33 below shows a comparison between the year of enactment of EIA legislation, the year of commencement of the earliest project planning phase, and the earliest year of project ratification for each of the OMEGA Centre Study Countries. The graph shows that only 4 of the 10 OMEGA Countries have projects where the commencement of the planning phase pre-dates the enactment of EIA legislation (with a total of 7 projects). This means that 76% of the projects studied had the potential for EIA studies to be undertaken at any time during the project planning stage, including the concept stage, whereas only 23% did so in reality.

Figure 2.33 : Graph showing year of enactment of EIA legislation against earliest planning and ratification start dates per country of OMEGA MUTPs



The above analysis establishes that the majority of projects were planned during a time when sustainability, based on the notion and multi-dimensions it has attained today, was *not* on the project's agenda as a term defining a planning goal. Only a relatively narrow component of today's Environmental sustainability goals have been found addressed in the projects reviewed, to varying degrees, through the EIAs undertaken at various stages during their project life cycle.

To allow comparison of project performance across all 27 case studies against concepts of sustainability as reported by the OMEGA study Partner returns, a number of sustainability principles were derived from current UK policies. This was done since few Test 2 Partner returns reported in detail the policy framework used to assess their projects' performance. The sustainability concepts as used by the UK Test 2 analysis have been used as the basis for the development of a sustainability concepts framework related to social, environmental, economic and institutional aspects of sustainability.

The findings of the quantitative analysis of Test 2 of OMEGA Partner returns is outlined below (see Figure 2.34). The figure shows that by presenting the average number of projects adhering to any sustainability principle from the four dimensions of the concept, project adherence is most common with Environmental Principals, followed by Economic Principals, and then followed by Social Principles. Institutional Principles have a very low reported level of coverage. From anecdotal evidence, the dominance of Environmental Concerns over other forms of sustainability is unsurprising.





2.2.2 OMEGA MUTP achievements incorporating environmental sustainability principles

Figure 7.32 below shows a list of 8 Environmental Sustainability principles applied to the findings of the 27 case studies. The most common principles with evidence of adoption by the reviewed projects related to the reduction of waste and environmental degradation, sustainable consumption and production, and the conservation of cultural heritage and natural resources. Few of the MUTPs reviewed addressed sought to minimise their future vulnerability to climate chance, which may expose the projects to significant levels of environmental risk. For example the CTRL was constructed through a number of low lying flood planes in South East England.



Figure 2.35 : Graph showing adherence to different aspects of environmental sustainability principles for OMEGA MUTPs

Figure 2.36 below shows the incidence of eight Environmental Sustainability Principles by project as reported by the Test 2 OMEGA Partner returns. From these responses one may note that the majority of projects were found to fulfil between 35 and 50% of the Environmental Sustainability Principles identified.

Figure 2.36 : Graph showing individual OMEGA MUTP performance against environmental sustainability principles (as % of eight environmental principles fulfilled)



2.2.3 Project achievements incorporating economic sustainability principles

Figure 2.37 below shows a list of 5 Economic Sustainability principles which according to the OMEGA Partners responses were applied to the findings of the 27 case studies. From these sources, the most common principle with evidence of adoption (by 33% of the projects) relates to claims that economic developments were compatible with environmental objectives. Few projects, however, appeared to exhibit any accelerated decision making on

grounds of key environmental, economic and social benefits being achieved. Most reported coverage of financial analysis appear, furthermore, to have been of a short term nature (for example CTRL vs. Ryan air, Swedish expansion of motor car use), while the majority of reported economic analysis was described as essentially rather narrow and of a financial nature.





Figure 2.38 below shows the incidence of the five Economic Sustainability Principles by project as reported by the Test 2 returns of the OMEGA Partners. The few projects exhibited evidence of adherence to more than 2 of the five principals.



Figure 2.38 : Graph showing individual PMEGA MUTP performance against the economic sustainability principles (as % of five principles fulfilled)

2.2.4 **Project achievements incorporating social sustainability principles**

Figure 2.39 below shows a list of 8 Social Sustainability principles applied to the findings of the 27 OMEGA case studies as reported by research Partners. This source suggests that very few projects appeared to exhibit adherence to any significant number of social sustainability principles. No projects, on the evidence presented by Test 2 returns, where found to include evidence of public interest evaluation.



Figure 2.39 : Graph showing OMEGA MUTP adherence to social sustainability principles

Figure 2.40 below shows the incidence of the eight Social Sustainability Principles by project as reported by Test 2 returns from OMEGA Partners. All the MUTPs reviewed, except the Perth to Madurah Railway, show low levels of adherence to Social Sustainability Principles. Only the Japanese and Australian projects exhibited any degree of consistency towards the adoption of 1 or more social sustainability principle across all 3 projects.





2.2.5 OMEGA MUTP achievements incorporating institutional sustainability principles

Figure 2.41 below shows the average incidence of the six Institutional Sustainability Principles by project as reported by Test 2 returns. This source suggests that very few of the projects reviewed appeared to exhibit adherence to any significant number of institutional sustainability principles. On the evidence presented by Test 2 returns, no MUTPs where found to include evidence of policy to support sustainable use of asset.



Figure 2.41 : Graph showing OMEGA MUTP adherence to institutional sustainability principles

Figure 2.42 below shows the incidence of the six Institutional Sustainability Principles by project (as a percentage of the six principles fulfilled) as reported by Test 2 returns from the OMEGA Partners. This source reveals that only the French projects exhibited any degree of consistency towards the adoption of one institutional sustainability principle across all 3 national projects.

Figure 2.42 : Graph showing individual OMEGA MUTP performance against institutional sustainability principles



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2.2.6 Summary of key findings from Test 2

The key finding from Test 2 was that 93% of the 30 MUTPs could not be identified as being formulated according to sustainable development principals based on the notion and multidimensions such principals have attained today. Furthermore, whilst the majority of projects studied undertook Environmental Impact Assessments, only 23% of these projects included EIAs which were identifiable as undertaken during the project conceptual stage – considered the point at which an EIA's outcome has the greatest potential for a positive impact on a project's decision making.

From an exercise which sought to quantify the frequency by which the OMEGA Case Study samples adhered to the four dimensions of sustainability as defined today, it was found that project adherence was most common with Environmental Principals, followed by Economic Principals. Social and Institutional Principles were found to have a very low adherence.

2.3 Test 3: Treatment of risk, uncertainty, complexity and context in decision-making

The following comprises a synthesis of Test 3 findings from across the full suite of (twenty seven) completed case studies.

2.3.1 Key Contextual influences

Of the nine contextual sets of influences seen to significantly affect the outcome of the twenty seven MUTP case studies reviewed, Figure 2.43 highlights the three most important as being: political influence (77% of the case study projects), economic climate (74% of the case study projects) and prevailing institutional context (56% of the case study projects).





It is unrealistic to provide examples of a single set of contextual forces affecting the outcomes of a particular MUTP as multiple contexts work in unison to create net effects. In other words, a single decision may be influenced by all nine sets of contexts as identified in the figure above (albeit each in different ways and at different levels). With this statement in mind a number of examples are given below to illustrate how different contextual forces interact with MUTPs and affect their outcomes.

2.3.1.1 Examples of political contexts

Political contexts were found to be *critical* for many, and *highly important* for the majority of MUTPs studied. It was found that the preferences and motivations of the most powerful politicians have direct impacts on project viability. In some instances these were found to appear irrational, and/or often focus solely on short-term political objectives. The extension of the Athens Metro was, for example, delayed on account of an influential minister in the Greek Government (Anthonis Tritsis – an architect/planner) possessing a long-standing scepticism about metros as a major mode of urban transport in Athens. As noted by the Greek team, an interviewee explained that: "....his (Tritsis') view was that a tramway would be more ecologically sound". The Australian team's findings suggest that in the case of the City Link Project, "Politically, the newly elected Liberal Government (of the time) had to demonstrate that it was capable of delivering a major project more successfully than its predecessor". They reported that an interviewee claimed that the City Link project was as 'inevitable' way for a new government to make an impact". As regards the development of the Sydney Cross City Tunnel Project, the Australian Team reported that at the time, "Within the government, there were factions seeking to prevent the Minister for Roads becoming Premier - and on this basis the Treasury refused to fund projects for Roads on account it would entrench the Minister's success as a politician."

As earlier indicated, the importance of political champions and political guardians for the success of MUTPs was a re-occurring theme. For the Attiki Odos in Athens, for example, the Greek team reported that ".....the whole project materialized due to the power ...of Minister Stefanos Manos and a group of other people with the (compelling) passion of a missionary". Similarly, according to the Japan team, facing the prospect of escalating costs during the construction of the Japanese Oedo Line in Tokyo, the careful management by a key political figure (Mr. Ishiharaallowed the project to continue - although he subsequently expressed concern about the project's rising costs, saying: "I thought we had bought a Corolla, but it was a Benz", suggesting that he was against absorbing the additional cost for continuing the project. To try and change his mind, the implementing institutions invited him to the construction site, which he duly visited, and as a result changed his mind and agreed to bear the additional cost. The Greek team described such champions as persons who "..... were visionaries, context-aware, innovative and capable of inspiring teams, and orchestrating processes that take the lead." In addition to political champions, "political guardians" were also identified as critical to the success of MUTPs. Such parties are especially important in protecting MUTPs in times of government change when new administrations may introduce major changes in priorities and processes which might delay or accelerate a project.

The impact of policy changes on MUTPs was also identified as important by the Netherlands team who note that while the HSL-Zuid project "...was meant to be a substitute for air travel, for this to happen it needed to be embedded within a wider policy context that also addressed the price of flying. So, insofar as this is the case, an effective mobility policy context is crucial to enable the wider objectives of a MUTP to be effectively met".

2.3.1.2 Examples of economic contexts

The nature of macroeconomic contexts (and changes thereto) were reported by all OMEGA Partners as critical to the outcomes of MUTPS, for a number of reasons. One important factor is the critical two-way link between national economic health and project finance/viability. In some instances, as in the case of the Perth to Mandurah railway, which was planned and built at a time when Australia's fortunes had been greatly enhanced by the country's new and important place in the global economy (supplying raw materials to the fast growing economies of China, India and the Asian 'tigers') this situation "....created a context by which the public sector could finance the much needed project", whereas in earlier economic circumstances, this would not have been the case. Similarly, the Greek MUTPs were conceived when (according to the Greek team) "....increased EU funding was available which permitted public-private partnerships to go ahead, despite the 'questionable' sustainability benefits they were seen to offer".

Conversely, during more uncertain economic periods, MUTPs may be positioned as important agents of strategic change to effect economic stimulus. According to the Sweden team this was the case for the Southern Link Project where the ".....political assertiveness (of ...) was motivated by soaring unemployment figures and the continuing recession. Here, the traditional Keynesian role of employing new infrastructure investment as a stimulus in times of economic difficulties played an important part in making the MUTP happen". Similarly, in the case of the extension of the Japanese Shinkansen Railway to the Kyushu region, the Japan team note that ".....this project was promoted on the basis of reducing economic imbalances between the region and the rest of Japan, thus improving Japan's economic competiveness over eastern Asian rivals".

Economic contexts and the changes they spawn can also be the source of significant risks to MUTPs during *all* phases of the project lifecycle. Many examples were prevalent at the time of the collapse of the Japanese bubble economy in the 1990s that affected the process of land acquisition during the Tokyo Metropolitan Expressway Project – where the poor economic climate resulted in some landowners being unwilling to sell their land to the project promoters. Similarly, the global energy crisis in 1973 and following financial crisis of the Tokyo Metropolitan Government led to major project cost reductions during the planning phases of the Japanese Oedo Line. According information collected by the UK team, the 1992 Global Economic crisis was a major contributory factor to the UK Jubilee Line Project's 18-month moratorium during the early implementation stages of the project.

Test 3 reports also highlight the ability of MUTPs to contribute to significant economic risks at the local level – especially concerning appropriate land-use development.. For example, in regard to the Millau Bridge, the France tem note that there were "…numerous challenges for the local authorities .. to avoid a situation in which the motorway... resulted in .. small business park developments .. every 8 kms". Similar but more widespread risks were encountered by the Attiki Odos project where the Greek team reported that the "…..Athens sprawl in the areas of Mesogeia and Thriassio Plain is a very negative achievement of sustainability that has to be credited to Attiki Odos".

2.3.1.3 Examples of institutional contexts

A wide selection of themes and situations were reported by Test 3 findings which can be classified as being relevant to the institutional context. The existence of strong institutions with past mega project experience is highlighted in many reports as an important contextual ingredient for the successful delivery of a MUTP. For the Athens Metro it was found that "….Institutional weaknesses make projects vulnerable to political whims - institutions in Greece are not considered to be strong enough to secure a long-term robust and rational planning regime and vision that is followed by all actors".

In regard to the Oresund Link, it is suggested that the institutional aspects of the project were handled successfully. As noted by the Sweden team: ".....Given the nature of the project, involving two nations as well as being a combined road and rail project, it is clearly the case that no such agency existed. The trans-national aspect of the project did however mean that much of the initial planning and appraisal phase was carried out by Oresund's delegation, a group of experts and bureaucrats' with close ties to the relevant ministries and national road and rail agencies in the two countries".

A further important institutional characteristic relates to transparency and the willingness to participate across traditional institutional boundaries. For the UK CTRL project it was noted that ".....it would seem that the establishment of close working relationships within and between organisations greatly helped to overcome barriers and silos" and helped to foster a mutual understanding of organisations' motives and positions. This finding resonates with experiences from the Athens Metro where the ".....lack of co-ordination started at the top in the public sector". The Netherlands experience highlights those political decisions which actively fragmented key institutions charged with MUTP delivery, as follows: "....In the 1990s it was seen as necessary to introduce the market into the public transport sector because the EU would want that. For the national railways this meant that the company was split into several pieces, including an engineering department, the infrastructure provider/supervisor and the transport operator. This caused a great deal of friction between the national railways (NS) and the national government, and made it difficult to integrate the project within the national transport system. It had to be on a separate track that could be put out to tender, and this made the entire process far more complicated."

However, the success of project teams within a particular context can reinforce path dependency, as a contextual trait of many private sector institutions within the MUTP sector – high levels of risk were seen to be introduced when previous experiences/practices are replicated without due concern for the prevailing context. The Australian team note that".....the existence of project teams already established from previous projects in merchant banks, especially Macquarie Bank, and in construction companies... can lead to the desire to keep these teams together, and employed. This leads to the support of projects which the teams already know how to do, and in the minds of some interviewees to the production of projects which may not be financially successful".

2.3.1.4 Examples of infrastructure contexts

Somewhat unsurprisingly, Test 3 findings highlight the importance and potential impacts of existing infrastructure on MUTP decision-making for approximately 50% of the projects studied. As reported by the Greece team concerning the Athens Metro Project, ".....Complexity increases for projects in heavily developed areas - networks (public utilities), land uses and the population represent complicated interrelations where the public sector has significant responsibilities." This observation was echoed by the Japan team where the Metropolitan Expressway project was "....extremely difficult to implement (using) the open cut method under the 6th Circular Highway because of space constraints, interruptions in surface traffic and living environment" which led the project team to opt for a tunnelling solution despite the immaturity of relevant technologies and the necessity to develop significant levels of new technology to allow the completion of the project.

2.3.2 Importance of Strategy

Figure 2.44 below shows the distribution of projects against a classification of common characteristics of projects related to strategy. From test 3 findings, 18% of the projects, such as the CTRL, were criticised for not having a clear overriding strategic plan at the outset.

30% of the projects were observed to have a co-ordinated strategy at the outset, whilst for almost half of the projects 'strategy' emerged over time.

Figure 2.44 : Graph showing common characteristics of strategies adopted as identified by Test 3



For projects such as the CTRL, where there was no clear commonly shared strategic plan until rather late in the day, there appears to be a strong element of 'muddling through': ".....it (CTRL) was more usually characterized by ad hoc decision-making in response to new and changing contextual elements". Test 3 findings also contain strong evidence of projects developing or adapting strategies over time in response to underlying contexts – e.g. the Japan projects, which developed a series of (context-led) strategies such as the use of technological solutions to side-step social problems which were developing around the options for the Metropolitan Expressway.

MUTPs with piecemeal and evolving strategies are contrasted with a minority of projects which adopted defined strategies - such as the Sydney Cross City Tunnel, for which an interviewee described the decision-making process as 'DAD' (Decide, Announce and Defend). The Australian team commented that the "The DAD model also reinforces the tendency to be inflexible once the decision is made and to place less emphasis on rational and objective analysis prior to decisions".

Figure 7.43 below shows the prevalence of three particular strategies.30% of projects used PPP contracts as a means to mitigate risk, although the outcome of this strategy was mixed. The Greece team report for the Rion Antirrion Bridge: "....the project lifecycle risk rationale of a PPP had a positive role in RUC and context treatment. The design and construction of this technically risky project was conducted by taking into consideration the demands and challenges of its operation and maintenance." By contrast, the Netherland's HSL-Zuid encountered risk in using the PPP approach: "....Because the PPP construction route was adopted, a private company was hired to build the project and it was kept within the Ministry of Transport. The project group had a budget many times greater than the Rijkswaterstaat and direct access to the minister, and seemed to get everything they desired from the minister. This, according to the respondent, caused a great deal of friction and eventually led to a power struggle that was lost by the project group".

14% of the projects adopted a strategy of dividing the project into parts, for example the Paris Meteor and Tokyo Metropolitan Expressway. In regard to the latter "......The Corporation strategically divided the project (Meta project) into smaller parts, and implemented planning and construction from the easiest to the most difficult part of the project. The Attiki Odos ".....was split in 6 different parts with separate financing so that if the project was halted they could be financially viable if re-tendered differently". Similarly, the CTRL was divided into two phases as a means to minimise risk in 1998.



Figure 2.45 : Graph showing particular strategies adopted for comparable OMEGA case studies as identified by Test 3

2.3.3 Closed/open systems and project boundaries

Figure 2.46 shows the number of projects that were considered to be treated as open systems, closed systems or, closed systems which subsequently 'became open' at some point in the project lifecycle. Over half of the case study projects were seen to be closed systems, whilst only 35% were considered to be open systems.

Judging whether a MUTP is treated as 'closed or open' is not a straightforward matter as many projects exhibit characteristics of both. For example, the CTRL was treated as 'closed' but with the following qualifications: it was initially treated as a closed (or 'frozen') system in terms of financial (demand) modelling and appraisal as part of the business case assembly; it was subsequently treated as an open system in terms of accommodating broader (spatial restructuring and regeneration) objectives..

The Japanese Metropolitan Express way is an example of a closed system which was 'forced open' by context, due to stakeholder pressure in the form of objections from local residents. The Millau Bridge was seen to change over time from "....a closed system to an open one *under* the influence of two main movements: the increasing public sensitivity to sustainable issues; globalisation, in particular through the impact of EU regulation on the trend to open the competition".

The HSL-Zuid similarly appears to have been seen as an open system during its early phases but was subsequently 'closed' (or frozen) in order for implementation to proceed – a very common characteristic of the MUTP delivery phase: "....Some project leaders are purely oriented around engineering and construction, and want to keep the project as simple as possible with a narrow set of goals and objectives. The HSL did not have this kind of project leader. The first leader was primarily concerned with the decision-making process and his organization became a knowledge generator, looking at alternatives. But as the later project leader noted, it was not organized for project management, and was not able to do things in parallel (i.e. generate knowledge and get things done at the same time"

Analysis presented by the Australian team introduces the notion that MUTP 'success' is related to the ability to both define realistic (project) boundaries and that there are risks associated with 'overly' open systems. For the Melbourne City Link ".....the success of this

project could be said to have occurred because of strenuous efforts made to limit (or place boundaries around) the objectives of the project to those that were directly attributable to the project. That is, the project was not allowed to become part of larger or other objectives". Whereas for the Sydney Cross City Tunnel, ".....The original planners of the *project* clearly viewed *it* in the wider systemic context of the city and its global environment. This was very much an open systems perspective. However, the problem was that the system wasn't adequately closed by the project – the objectives were not encircled by the logic of the project and thus could be abandoned even after the project was delivered"

Examples of purely closed systems include: The Perth to Mandurah Railway which "......was in no sense driven by a desire to create land use and transport integration. This project was about reducing congestion on the freeway. It was planned as a closed and carefully bounded system which, following best practice contracting in Australia, was carefully protected from outside interference and scope creep"; Hong Kong's Western Harbour Crossing, where the "......objectives were seen to be: to link HK Island with the HK International Airport (HKIA) and the container port in Kwai Chung, to alleviate cross-harbour traffic congestion; to open up the western side of HK to development. These objectives seem to approach WHC as a stand-alone closed system".



Figure 2.46 : Graph showing OMEGA MUTPs treated as open/closed systems.

2.3.4 Governance issues

The existence of regulatory systems was reported as a significant risk factor in one-third of the case study projects, as shown by figure 2.47 below. The Netherlands' HSL-Zuid experience suggests evidence of legislation working against the formation of cohesive cross-discipline dialogue, and reinforcing institutional silos: ".....Designating the project as subject to the 'Tracewet' act made it difficult to treat it as an integrated project because the act is very sectoral, purely concerned with line infrastructure. This meant that for all the talk about integrating the project with other spatial aspects, once the legal machine started rolling the power positions changed and suddenly the Ministry of Transport says: 'it is a Tracewet project and because of this we are prime project leader and authority. A similar experience is reported by the UK CTRL Project: "....Government policy capable of guiding CTRL planning and delivery was effectively reflective of professional silos - DoT pursued solely transport matters while the DoE sought to insert broader considerations".

In regard to the Melbourne City Link, legislation appears to have reinforced fundamentally unsustainable objectives, thereby exposing projects to long-term risk:"....The Kennett government transport policies supported the connection of Melbourne's major freeways and propose private funding to do it. They also recognized the importance of coordinating transport planning with land use planning. The view was that as urban areas grow and economic activity decentralizes, traffic congestion would extend over larger areas and for longer periods during the day. The objectives, however, were formed within an assumption of declining public transport use (at that time), no major investments in public transport infrastructure, privatisation and fragmentation of public transport management, and high priority to be given to providing major improvements in road infrastructure".



Figure 2.47 : Graph showing risk factors associated with regulations for comparable OMEGA case studies as identified by Test 3

2.3.5 Access to relevant and accurate project information

The importance of relevant and accurate project information is highlighted by a number of themes covered under various sections of this Test 3 summary report. 40% of the case studies identified significant levels of risk associated with 'traditional' forecasting methods used to provide information concerning anticipated user demand as an input for CBA, and ultimately an indication of the financial viability of the project.

Another risk factor cited in 30% of case studies concerns the lack of public consultation – especially in relation to information gathering from key stakeholders.

2.3.6 Forecasting and appraisal Tools & techniques

40% of Test 3 findings cited methods and tools used to forecast user demand as significant sources of risk. Not only are forecasts frequently inaccurate, but there is evidence to suggest that they are often manipulated for political reasons. For example, early attempts to proceed with the Athens Metro were blocked due to "....poor forecasts concerning traffic jams during the construction phase – this was one of the reasons that the politicians were hesitant to decide to build the metro.". Slightly under a third of Test 3 findings indicate that

uncertainty associated with estimates of patronage levels represented a source (and level) of risk.

2.3.7 Role and impact of Innovation

Figure 2.49 below shows a graph of common forms of innovation observed to be a feature of the 27 case studies. 40% of the case study projects were characterised by some form of 'novel', untried or untested technological solutions. There were observed to be both positive and negative impacts associated with the use of such technology, for example: the objective to introduce un-manned trains on the Paris Meteor resulted in a 2-year delay as a result of issues concerning safety and industrial relations (".....Resistance to the automation of the line came from the RATP drivers who were concerned that they would lose their jobs. It was also due to the 68% cost increase between 1990 and 1993RATP also demanded additional fine-tuning of the automated systems from the manufacturer delaying the project by two years"; similarly the HSL-Zuid project adopted new systems, the safety aspect of which caused significant delays ("....One of the important mistakes made in the case of the HSL was the choice of a safety system of which nothing was yet known because it had not been developed. This led to problems with the safety infrastructure for the project and also with ordering the trains - the specifications were still not known when the order was due (to allow operation to begin as soon as the infrastructure was completed)"; the JLE project's slow implementation phase, and subsequent project management re-structuring leading up to the Millennium Dome deadline, was due to the choice of a 'moving block' signalling system to be supplied by a contractor with little prior experience of implementing a fully functioning system.

More positive examples of the application of new technology come from the Australian, French and Japanese case studies. For example, in regard to the Melbourne City Link Project: ".....The tolling system was one of the greatest risks carried by Transurban and through the Design Build contract Transfield/Obayashi. Without functioning to a high degree of accuracy no revenue would have been able to be collected." Japan's Metropolitan Expressway embraced new technology as a tool for reducing other forms of risk: ".....The Corporation changed the policy and designed the construction works by assuming the shield method in the late 1990s. However, the shield method and relevant technologieswas so immature at that time, the Corporation had to invest a certain period in research and development until private construction companies developed innovative methods in the 2000s". This experience of 'risk trade-off' is echoed by the Millau Bridge, where the public administration and Eiffage (private sector) were seen as "....both risk taking and risk reducing agents". The France team consider this trait to be "....a large part of the innovation process". For example, they observe that "...the importance of the engineers on both sides and their common technical culture with a common value about the 'technical adventure' was balanced by the strong state presence and influence which both stimulates the risk taking by innovation and at the same time cushions the consequences by bringing a lot of legal guarantees."

A second significant characteristic in regard to innovation is that which takes place within and between institutions responsible for the design, appraisal and delivery of MUTPs. Frequently this is most significant when considering the prevailing modus operandi for each country. For example, during the negotiations between the Netherlands and Belgium on the HSL-Zuid, a new institutional framework was established to facilitate decision-making between the two countries: ".....The process led to the establishment of a young and small transport ministry in Flanders that was eager to learn and was less burdened by the history between the two countries, so that the search for win-win was easier ". In regard to the Greece case studies there is evidence to suggest that institutional innovation took place on a number of fronts. The Greece team thus observe that: ".....many interviewees pointed out that an important achievement was the change in mentality and the quality culture brought about by the project, including changes not only in personal but also the institutional mode of operation and corporate behaviour. Interviewees variously suggest that the quality culture of Attiki Metro SA was a seed that still remains and that a change of mentality was achieved by those projects...."

Interestingly, 33 percent of test 3 submissions regarded the use of experts and 'best practice' as a significant tool to mitigate risk. The Netherlands team note that the Beneluxlijn was ".....all about 'best practices' developed in the last four decennia of metro building in Rotterdam. The project leader at the time deliberately chose not to use new techniques, but to use the knowledge present in the organization. His own experience dated from the construction of the first line of the metro in Rotterdam. These 'best practices' were of course within the same local context – not a transplantation of best practices from other institutional and social settings".



Figure 2.48 : Graph showing commonly cited sources of project innovation

2.3.8 MUTP stakeholders

Figure 2.50 (below) shows a series of commonly cited issues related to MUTP stakeholders. Slightly over 50% of the Test 3 returns highlighted the importance of consensus building with multiple stakeholders. This issue is particularly significant as many of the interviewees link consensus building between multiple stakeholders as a key means of removing obstacles, but at the same time, dealings with multiple stakeholders are seen to represent a significant source of project complexity – this latter was seen to be related to the fragmented and silo-oriented nature of some stakeholder groups.

The Netherlands team highlight the potential of consensus building to enable MUTPs to proceed: "....Consensus building is very important in the Dutch context, and the Randstadrail project was a complete consensus. The project budget changed from EUR 6bn to EUR 1.5bn, which meant that 'a lot of water had to be put with the wine'. There were important stakeholders who, concerning political power, were reasonably equal: the regions of Rotterdam and The Hague, and the Ministry of Transport. Thus there was a great deal of consensus building".

It was observed that the Paris Meteor also made considerable legal planning progress as a result of consensus building: ".....Consensus was finally achieved between the public financiers and RATP in 1989 which considerably simplified the incorporation of the project into the State-Region planning contract (contrat de plan Etat-région) and financing programme. RATP had anticipated the interest of the Region and the State in the competing

Eole project and proposed a complementary rather than competing route. The position of each financer had been well determined by RATP, with the latter having clearly understood that it was vital for it to convince the State (the main decision-maker in the IIe-de-France region at that time)." For the UK case studies, interviewees similarly emphasised the need to build consensus – notably at an early stage in the project lifecycle.



Figure 2.49 : Graph showing commonly cited issues related to OMEGA MUTP stakeholders

Approximately 40% of the test 3 findings highlighted the negative nature of project impacts due to professional and institutional silos. For example, in regard to the New York Airtrain, the USA team note that: ".....This type of complexity is rooted in the organizational context of the U.S. transportation system. The system is characterized by modal 'silos' in which single modes of transportation are handled by separate agencies; and planning and funding across the agencies is extremely difficult. "

However the Test 3 findings also suggest examples where the adverse impact of professional and institutional silos were overcome – for example in the context of the Athens Metro (".....the urgency of the project and the autonomous management team allowed traditional silos to be overcome") and the New York Airtrain (".....The organizational complexity associated with building a project that required crossing 'silos' separating air, rail and highway modes (a feature of the US context) was successfully handled only by having a high level political champion, critical interagency cooperation and coordination at both executive and working levels and, when required, skilful negotiation by a designated official").

2.3.9 Analysis of commonly cited MUTP stakeholders

Figure 2.51 below shows an analysis of stakeholders common to more than one of the 30 projects studied. Ove Arup was found to be involved in 25% of all projects studied. However presenting a clear typology of stakeholders is complicated by the range of delivery structures

and variety of roles found in the 30 MUTPs. In some cases, a public sector client body retained the overall design and project management functions, letting out separate contracts for detailed design and construction of specific parts of the project (with one contractor or joint venture often winning two or more separate contracts, but without any contractual relationship between separate contracts). Specialist contracts (e.g. to deal with mechanical, electrical or IT works and equipment) were generally also managed by the client - the most common stakeholder in this group is Siemens. A similar case is that in which the client is a quasi-public body such as a national state-owned rail company.

In other cases, such client body functions were transferred to private sector concessionaires. These organisations tended to be joint ventures or consortia involving established construction and other companies, formulated to provide a combination of skills and experience specific to the project, and thus minimising contracting out to other companies. They generally included a subsidiary company to manage the operations phase of the concession. Although these organisations initially operate as single-purpose vehicles solely to deliver the project in question, they may be absorbed within a larger infrastructure provider during the concession period. In many concessionaire-led cases, the original public sector client engaged consultants prior to awarding the concession, for a range of preliminary tasks such as feasibility studies and evaluating concession bids. In a limited number of cases, public sector clients used private sector project management consultants to manage the design and construction process on their behalf.

As an example of the variety of roles played by such stakeholders, it is seen that Ove Arup's involvement in the case study projects included: independent evaluation of SNCF's proposals for TGV-Med (in response to public opposition and mistrust of SNCF's perceived vested interests); design of the Hong Kong station and tunnels for the Hong Kong Airport Rail Link; project co-ordinator for Hong Kong's Western Harbour Crossing Consultants; one of five detailed design contractors on the Hong Kong West Rail; one of four consulting engineers on Oresund Link bridge; one of four members of Rail Link Engineering consortium project managing delivery of the CTRL; half of the joint venture design consultant on M6 Toll Road; Secretary of State's agent (and structural engineers architectural fit-out for Canary Wharf station, civil engineers on Stratford station) on JLE.



Figure 2.50 : Most common MUTP stakeholders (including national subsidiaries and involvement in joint ventures)

56



Figure 2.51 : Most common financial MUTP stakeholders

2.3.10 Importance of trust and transparency

Trust and transparency were identified as key issues for approximately half the projects studied, as shown by figure 2.53 below.

Many of the case studies cited poor levels of public participation in projects as a transparency issue, which created significant levels of project risk. The Greece team that the "....Lack of public participation creates risk - formal public participation is confined to consultation on the EIA which includes a short period for comment and objections. There is generally a reluctance on the part of authorities to adequately inform the public if there is limited pressure to do so".

Other transparency issues focused on private sector negotiations and the lack of transparency afforded to key project stakeholders concerning such negotiations. For example in the case of JLE, an interviewee observed that: "I would say that there is various degrees of transparency, not that there was insider trading but various degrees of transparency". In regard to the Sydney Cross City Tunnel more widespread issues were noted by the Australia team: ".....The lack of transparency is so deeply ingrained that many believe the contract for the project is not available on the public record. In fact it was released as part of the Joint Parliamentary Inquiry process, but remains buried in a series of boxes held by the Parliamentary Office, and as yet unlisted in any public record".

However, some note that transparency can itself be a source of risk. As noted by the Netherlands team in the context of the HSL-Zuid project, financial transparency was required by politicians but ".....financial transactions and negotiations remain difficult and too much openness could give an undesirable advantage to private sector counterparts. With the

tender, for example, MPs wanted to know how much everything would cost and they wanted to hear it in a public hearing. The project leader asked to have a closed session, but the MPs refused. So all the contractors were present at the hearing to hear how much money there would be before they submitted their tenders."

Trust was seen as a particularly important pre-requisite for many of the commercial transactions which underpin the viability of MUTPs. Successful working relationships with project contractors need to be built on trust, as noted in the context of Hong Kong's Airport Railway: "....A particularly successful project management strategy during the uncertainty before project commencement was the MTRC's ability to retain appointed contractors while the project was on hold. Contractors agreed to honour their original proposed commitments, despite an eleven month delay in commencement – such was the construction industry's faith in MTRCs resolve and ability to see the project through." Conversely good working relationships can clearly be lost through lack of trust – for example in the context of the JLE project when the lack of prompt payment destroyed trust between the contractors and project management, resulting in a loss of performance and industrial action..

The Australia team highlight the link between trust and transparency from the Sydney Cross City Link, as follows: "....Trust is maintained through transparency – the ability of the public and stakeholders to know what is being done, for what reasons with what effects. Transparency of government was poor in NSW with politicians being averse to scrutiny".



Figure 2.52 : Graph showing number of OMEGA MUTPs where trust and transparency were highlighted as important issues relating to risk

The two principal risk mitigation measures associated with trust and transparency identified by Test 3 are the establishment of information sharing capabilities between project stakeholders, and public consultation/participation as shown by Figure 2.54 below. An example of this can be found in regard to the Melbourne City Link where it was observed that: ".....Plainly there has to be a high level of trust among the key players in the project. This was achieved by clear contractual obligations, and a degree of 'give and take' in negotiations amongst the parties."

Figure 2.53 : Graph showing possible mitigations against trust and transparency related MUTP risk



2.3.11 Lesson learning/sharing

Approximately 40% of the projects underwent some form of evaluation or lesson learning exercise. The general picture that emerges is a distinct lack of effective formal channels for post project lesson learning and sharing. For example, the Sweden team note that: "...Thus there is no formal transfer of knowledge relating to the positive or negative attributes of a PPP in the Swedish context".

Possibly the most positive example of lesson learning and sharing can be seen by the Greek MUTPs - for example in relation to the Athens Metro where it is noted that "....one of the most important achievements, according to an interviewee, was the transfer of know-how which took place. This increased capacity and resulted in the extensions of the metro system lines to be designed by Greek consultants."

The Hong Kong experience highlights that where post project evaluation takes place, this is often narrowly focused on limited functional and technical criteria (especially financial returns).

Little explanation was suggested for the general lack of lesson learning and sharing. However, the Australia team note that: "....The prior success of PPPs both in NSW and Victoria led to complacency rather than learning, and the real lessons that should have been learned from these projects were not learned. The JLE case study also noted that lesson learning and sharing amongst the private sector is uncommon due to the treatment of knowledge/experienced gained in MUTP planning, appraisal and delivery as intellectual property with potentially high monetary value.

2.3.12 Summary of key findings from Test 3

Contexts: the three most important contexts identified by Test 3 returns were - Political context (77% of projects), Economic context (74% of projects) and Institutional context (56% of the projects).

Strategy: slightly under a third of the projects were recorded as having co-ordinated strategies, whilst almost half of the Test 3 returns contained strong evidence of projects developing or adapting strategies over time in response to underlying contexts. Common strategies for reducing risk included the use of public-private partnerships.

Closed/open systems: closed system treatment is dominant - over half of the projects studied were considered to be closed systems during planning and implementation stages.

Regulation: 'regulation' was reported as a significant risk factor in one-third of the projects.

Access to relevant and accurate project information: was found to be especially important when related to the reliability of information derived from/for CBA. A lack of information gathering from influential stakeholder groups was also identified as a key project risk.

Financial forecasting tools and techniques: were identified as a significant source of project risk in 40% of the Test 3 analyses (mainly relating to seemingly questionable forecasts of patronage levels).

Innovation: 40% of the projects listed some form of novel, untried or untested technological solution as a project feature. Test 3 returns reported a mixture of positive and negative project impacts associated with the use of such technology. Institutional innovation was observed within and between organisations responsible for the design, appraisal and delivery of MUTPs.

Project Stakeholders: slightly over 50% of the Test 3 returns highlighted the importance of consensus building with key stakeholders – especially as a means to remove significant obstacles. However, dealings with multiple stakeholders are seen as a significant source of project complexity.

Trust and Transparency: trust and transparency were identified as key issues in approximately half the projects studied. Many of the case studies cited poor levels of public participation in projects as a transparency issue. Trust was seen as a particularly important pre-requisite for many of the commercial transactions which underpin the viability of MUTPs.

Lesson learning and sharing: approximately 40% of the projects underwent some form of post-project evaluation. However, there was little evidence to suggest widespread lesson learning and sharing within and between the public and private sectors.

2.4 Test 4: Synthesis of Tests 1-3

This part of the report provides a synthesis of the UK/Partner Test 4 returns undertaken to identify trends in response to the following four questions:

- Identify the chief context specific influences on project achievements i.e. the context-specific forces that determined the performance levels of the project relative to existing project objectives and new 21st Century normative goals and related criteria (the latter as determined/agreed by the OMEGA Partner Network);
- Identify the principal stakeholder 'winners and losers' associated with project performance levels;
- Identify opportunities and threats to project development: the role of external factors such as **blocking and inducement mechanisms**.

Further details of the 4 Tests are outlined in the 4 Tests Guidance Note provided to partners in July 2009 (See appendix 9)

2.4.1 Chief context specific influences on project achievements

The following sections focus on Partner responses to Test 4 only. During the synthesis of these responses it became evident that most influences on project achievements identified as context-specific could not be considered as entirely unique to a particular context, and similarly those influences considered generic were not always uniquely generic, regardless of MUTP context.

Perhaps surprisingly there was more agreement between Test 4 returns listing context specific influences than those listing generic influences. The 'context specific influences' were often in fact <u>generic</u> influences affecting the project in uniquely different ways.

2.4.1.1 Geographical/Physical influences

In a number of projects, physical and geographical influences had a significant impact on the project's achievements – for example:

- Rion Antirrion the adverse physical conditions in the Rion Andiron area resulted in the project becoming much more complex in technical terms – raising costs and increasing the time required for completion;
- Tokyo Expressway the geographical location of the surface option for the Japanese metropolitan express way was to cut through a densely inhabited area - the project could not significantly interfere with urban utilities, power lines and heavy traffic leading to a more costly tunnel option after significant local opposition to a surface route;
- Tokyo Oedo Metro relocation of Tokyo Metropolitan Government building from Marunouchi to Shinjuku in 1985 necessitated improving access from any place in Tokyo to the building);
- Perth to Mandurah railway during the planning and appraisal stage there was strong competing advocacy of a bus-based solution to transport in the southern corridor, backed by the South West Corridor Transport Study (SWAT). What appears to have turned the argument in favour of a rail-based solution was the need for rapid transport which could not be provided by buses. Rapid transport was required to link dispersed development areas down the length of the corridor. A bus-based solution would have tended to encourage development closer to the centre of Perth. This could not be allowed because of the need to protect the water mounds inland from the coastal corridor.
- **Kyushu Shinkansen** The geographical location of the Shinkansen project was far from Tokyo Metropolitan Area where the national government are located, leading to a reluctance to fund the project.

2.4.1.2 Economic influences

Periods of macro-economic bust: A common influence was found to be the macroeconomic context of the project, in particular the cyclic nature of national and international economies producing periods boom and bust. Periods of bust were observed to produce broadly two types of context specific influence impacting the MUTPs studied:

- delays in anticipated funds to realise the project to the original time scale; or
- the delay of anticipated secondary developments, often assumed to be provided by the private sector investments.

However, in some instances economic decline actually acted as a catalyst for counter cyclic investment in MUTPs.

Some examples of recessionary influences on MUTP projects include:

• JLE – The economic instability and global recession in 1992 and subsequent bankruptcy of Olympia York and Canary Wharf led to an 18 month moratorium on the UK JLE

project as the private sector contribution to the project as re-negotiated. There has been some suggestion that the insistence of a private sector contribution to the project was a stalling mechanism used by government to avoid a significant public investment at the height of UK economic instability;

- Hong Kong West Rail was seen as 'a victim of its time' because of the onset of the Asian financial crisis when the project started which lasted until West Rail came into operation. The financial turmoil had delayed residential property developments along the alignment, affecting its projected patronage and hence the projects internal rate of return.
- City Link Project at the beginning of the 1990s Victoria was experiencing a significant recession and a financial crisis. Victoria, once a focus of the manufacturing industry was beginning to be thought of in American terms as 'a rust bucket state'. So there was a strong incentive to pursue counter-cyclical investment led by government. Since funds were not available to government alone, the solution became a private-public partnership for the City Link Project;
- the Tokyo Metropolitan Expressway project was heavily influenced by the bubble economy and its collapse during the 1990s which influenced the activity of land taking for the project;
- the energy crisis in 1973 that worsened financial status of the Tokyo Metropolitan Government and led to the freezing of the **OEDO Line** project;
- the deficit of the Japan National Railways led to the freeze of **Shinkansen** construction in 1982 and the privatization of the Japan National Railways in 1987;
- after the Hong Kong Western Harbour Crossing was commissioned and started operation in 1997, it was subject to profound changes in context, to the extent that it was rumoured that its owners sought to sell it back to the Hong Kong Government (e.g. the Asian financial crisis of 1997/8-2001/2, collapse in the property market which undermined the Hong Kong Government finances and cased the postponement or cancelling of reclamation and road development projects that were expected to generate future demand for WHC;
- changed project objectives the change in the UK M6 Toll project status from public sector Relief Road (1980s) to PFI Toll Road (1990s) reflects changes in the prevailing political and economic imperatives which are key contextual elements. The limited availability of public sector finances in the 1990s meant that the project had to be pursued as a PFI.

Periods of Macro Economic Boom: Periods of economic prosperity had a significant impact on at least four of the project studied. Access to abundant sources of finance was seen as broadly positive in the Australian case, but with both positive and negative aspects in the Greek context.

Specific examples of the influences of economic prosperity on MUTP projects include:

- The **Perth-Mandurah railway** was wholly publically funded through the boom in iron ore and coal exports to support the growth of the Asian tiger economies. As such the project it lacked some of the contractual and financial complexity of the City Link and Sydney Tunnel projects, though there were considerable engineering challenges;
- A critical context for all three Greek projects was that EU financing was readily available with the beginning of the Community Support Framework programmes as Greece entered the EMU Euro Zone. This availability of money combined with the pre-Olympic era legitimised the government to borrow immense amounts of money in order to build speedily whatever was needed for the games and was seen as a broadly negative impact. However the PPP mechanisms chosen to finance the projects (in order for the state not to bear excessive debt and shift part of the implementation cost of projects to the future) had some broadly positive impacts related to Greek MUTP

capacity-building including significant levels of knowledge transfer from the EU to Greece.

The economy and project viability: Credible financial support was identified as critical for project success both in the early and late stages of the project lifecycle, where it is especially important for public sector projects which are unlikely to finance themselves. Specific examples are given below.

Respondents from the **UK JLE** highlighted the importance for credible financial backing as the critical pre-requisite for political support early on in the project life cycle. It is suggested politicians don't want to back losers, and credible financial backing acts to increase their certainty in a project.

The economic context may be the key to long-term project viability – clearly the above factors depend upon 'economics' (economically efficient operation and well analysed expansion are of paramount importance). However, it would seem that metros in general, and the **Athens Metro** in particular, cannot afford to finance a major expansion from its own funds and will require support from the public sector as metros are not attractive for private businesses.

A major flaw of the original financial solution proposed in the Dennis agreement (for the **Swedish Southern Link** project) was a lack of flexibility. The all-or-nothing approach of the Dennis agreement proved impossible to maintain when facing increasing political and public opposition. The final model, involving less money, fewer projects and more local and regional financial commitment has arguably been a lot easier to handle politically.

2.4.1.3 Sustainability influences

Few sustainability influences were reported in the Test 4 returns. Typically projects were planned and appraised *before* the advent of sustainable development and featured limited concerns for the environment. For example, in the Netherlands Randstadrail project: "Other goals such as sustainability were of less or no importance, though noise and safety aspects were important." In the Hong Kong Airport Railway project, "sustainable development concerns did not feature in the conception of Airport Railway."

Some of the most significant examples of environmental concerns having a strong influence on project achievements were from the Athens Metro and the Perth to Mandurah Railway projects – particularly in relation to air and water pollution issues:

- the Athens Metro project was reported as have significant influences from environmental issues where pressure from severe congestion and air pollution in the capital lead to associated popular demands to activate the project that had been in hibernation for some time. The move towards sustainability was a necessity – the influence towards achieving the result of large and increasing use of the Athens Metro was purely contextual (i.e. the immense traffic congestion in Athens that forced the people to shift to the metro);
- regarding the Perth to Mandurah Railway, Western Australia is a unique environment, with very high levels of biodiversity, large numbers of unique species, and fragile water and land resources in many places. This set the context for environmental issues for the project, with high environmental sensitivity, not least because a large proportion of water resources for the City of Perth comes from aquifers called 'water mounds' beneath the city. Perth is built on sand, so water percolates easily into the aquifers.

However, these influences were not typical of other Greek or Australian projects. The lack of response by local authorities and organizations to increased environmental sensitivity, and

their unwillingness to intervene in the alignment and scope of the **Attiki Odos** project, for example, is considered to be a significant non-achievement.

The expected environmental improvement in Sydney's central area from the **Cross City Tunnel** was not achieved because roads through the centre were not closed and the users of the surface streets were not diverted into the tunnel. In short, the project became "disconnected from its justifying narrative."

2.4.1.4 Institutional Influences

The Test 4 returns emphasised the importance of strong project visions as a constituent context of project success:

- the Melbourne City Link is seen as a positive example of the use of vision where the project was based on a strong logic to provide a link between two freeways, to connect the airport and the port, allowing freight traffic to avoid the city centre, and serving a major new housing and commercial development area in the renewal of Melbourne's obsolete docklands. The project was by far the largest and most costly motorway building project ever seen in Australia at the time;
- the JLE was realised due to a very strong private sector vision responding in part to the 1980s policy of docklands re-population but also seizing the moment provided by the deregulation of the financial sector 'big bang' in 1986 to provide a new type of office space, not possible under London City planning policies of the time;
- the Greek Rion Antirrion project was criticised due to the lack of a strategic approach to reap the benefits offered relating to the environment, institutions, social cohesion and the economy. The sustainability of those benefits appears to be contested by context– specific factors due to the lack of a strategic approach and a shared vision for the future of transport in Greece. To address this it was suggested the government would need an organisation capable of executing a program of projects according a priority list based on an overall strategic vision;
- The Dutch HSL-Zuid project had a strategic vision: a strong focus on the project was given by the so-called main ports, which are hubs of economic powers and transport and are seen as the motors of the Dutch economy. The HSL aimed at strengthening the main ports of the Rotterdam harbour and Schiphol Airport. Of course, as the train does not pass the Rotterdam harbour, the implicit focus was on improving the competitiveness of Schiphol. Construction of the HSL was already part of the deal when approving the expansion of the airport as a type of gesture to environmental concerns about short distance flights;
- Hong King West Rail was 'a victim of its time' because of a general lack of macrostrategic planning capacity in the city. Although the project was first conceived by professional engineers as a cross-boundary infrastructure, the Government did not pursue this path of development. This can be understood because back in the 1990s, the colonial government of Hong Kong had always kept a distance from China. Nevertheless, if the government were more open-minded and adopted a more transparent and accountable manner in developing this piece of MUTP, various decisions regarding objectives, alignment, phasing and the implementation of related property development might be enhanced.

Influence of traffic forecasts

Returns from four projects highlighted the influence of incorrect traffic and development forecasts on either project over- or under-performance. The first two examples below are of patronage forecast over-estimation causing financial loss through lower than expected patronage. The third and fourth examples are from the Swedish Southern Link where traffic was grossly underestimated causing the project to fall short of its technical and

environmental objectives. The fourth example also highlights the importance of updating traffic forecasts in the light of changing contexts:

- HK Western Harbour Crossing was conceived with clear functional objectives. However, these objectives were based on incorrect traffic and development forecasts/assumptions. Erroneous traffic forecasts have negatively affected countless toll road projects all over the world since BOTs and other privatization schemes became ubiquitous since the 1980s;
- Smaller than expected traffic numbers used the **Sydney Cross City Tunnel**, making it economically non-viable. Indicators of failure stacked up: potential users did not materialise, resulting in usage lower than expected causing the financial failure of the private consortium.
- It must be acknowledged that a major road project in a densely populated urban area will have strong effects on travel habits and thus the amount of induced traffic must not be underestimated (from the **Stockholm Southern Link** project);
- It is necessary to carefully examine how major contextual changes will affect the project. This may seem quite obvious, but the case of the **Southern Link** shows that not one but several major contextual changes occurred before construction commenced without a fundamental parameter such as traffic volumes being re-examined.

Influence of experience, competence and capacity

An influence emerging from the Test 4 returns relates to (lack of) institutional experience as a key source of project risk, which significantly influenced decision-making and the ultimate success of the project. To give some examples:

- the project leader of the Dutch **Beneluxlijn** wanted to use the knowledge that they had locally in building metro's over the last four decades. As a result no new techniques were introduced, which minimised technology risk;
- the lack of previous experience in the Ministry regarding PPP arrangements was problematical during the financial negotiations for both the Rion Antirrion Bridge and Attiki Odos. However in the case of the latter the lack of experience was mitigated by the application of strict PPP market practices;
- the Attiki Odos and Rion Antirrion Bridge projects suffered from a lack of institutional capacity and well-constructed/established mechanisms to support broad consultation and constructive communication between stakeholders. The lack of institutional capacity was compounded by the inability of public institutions to adapt to the challenges of a partnership role in a complex and demanding PPP. This position was contrasted by the Hong Kong Western Harbour Tunnel where the design and construct procurement strategy included reputable and proven design and construction companies, and with sufficiently well-managed interfaces between contractors, clients (WHT in this case) and the regulators (Hong Kong Government);
- the **Athens Metro** was delayed due to both tunnelling and archaeological issues that were not adequately researched ex-ante. This was surprising as archaeological issues are a well known factor of any project operating in central Athens, and tunnelling projects in general carry some of the highest risks of all civil engineering projects.

The Test 4 returns also reveal a particular sub-theme relating to the influence of private sector competence (both perceived and observed) on the realisation of project achievements:

- for the the **Athens Metro** project there was evidence of a cultural change supported by external consultants. Human resources employed on the project were critical to its success and people were hired on merit and not (as was previously the case) on the basis of political affiliation. Bechtel were seen as crucial in this institutional 'sea-change';
- for the Swedish **Arlanda Link** project there was no previous experience within the public administration of these kind of PPP projects, which meant that consultants from the

private sector became involved in the public planning process. However during the project there was tension between the need for private profits and the expectations of public good that had not been present in previous infrastructure projects;

- the separation of HK Airport Railway from the airport and its initial conception as a stand-alone project with operational performance targets similar to that of a private sector project, suggested images of a "privatization at all costs" logic, and the belief that all things done the private sector way is best. This led to private sector-inspired appraisal and evaluation approaches that did not take into account the impacts of the property and urban developments at Airport Railway station precincts on the wider urban fabric of Hong Kong. The HK Test 4 return notes: "private sector methods and approaches must be used where appropriate, not as a matter of ideological conviction" (emphasis added);
- a similar situation is reported during the Netherlands Randstatrail project: A public private partnership was first imposed by the national government on ideological grounds. However this was later dismissed on pragmatic grounds. The whole project became very pragmatic with the separation of transport systems and each municipal transport organization taking control of their own mode (Rotterdam and RET: metro; The Hague and HTM: tram; and Connexxion: bus). Moreover, both The Hague as well as the Rotterdam region got a lump sum agreement from the government, effectively transferring the risk from the national to the local level.

The influence of fragmented institutions/institutional relationships

Test 4 returns also highlight the impact of institutional relationships where a lack of cohesion between critical intuitions can provide a significant challenge, which if left unchecked can contribute towards negative project outcomes. Institutional cohesion is also context-specific – strong relationships formed between institutions prior to a project conception can be a double-edged sword – they cannot be necessarily relied upon to guarantee success during the project: Specific examples included:

- Attiki Odos the fragmented local government structure of the region of Attiki (i.e. 124 municipalities and 4 prefectures) caused a negative impact. Also, the historically-rooted long-standing relationships of the large constructors with the politicians had both a positive and negative impact for the project;
- Météor the difficulty of getting all the financiers to agree to the project, given that a competing project, Eole, was being proposed at the same time by SNCF, led to the Météor route being modified to meet the interests of the financiers and to be complementary to Eole. This competition between the two lines probably contributed to the lack of investigation of the most optimal route for a single infrastructure that would efficiently relieve the passenger load on Line A (which was a key project objective);
- prefectures and municipalities in the Kyushu region whose levels of commitment were considerably different towards the **Shinkansen** project
- the Randstadrail was planned and appraised within a context characterised by a long history of stalemates, difficult negotiations and fragmented institutions that somehow had to be integrated into one project;
- prior to the JLE project, the establishment of an institutional framework through the London Docklands Development Corporation (LDDC) with special planning powers was critical to the success of the JLE. However the formation of the LDDC, and therefore a single person in charge of docklands regeneration over five London boroughs, caused friction and resentment amongst the individual boroughs during the JLE project, and hindered potential co-operation over the development of the interchange facilities.

Few of OMEGA's International Partners reported mitigation measures to combat institutional fragmentation. The two examples quoted in the Test 4 reports were as follows:

- the urgency of the Athens Metro project (with the approach of the 2004 Olympic Games) and the autonomous management team allowed traditional 'silos' to be overcome this change in mentality induced a spirit of co-operation that the management of ATTIKO METRO SA managed to apply to the various utilities and transport organizations related to the progress of works. Given the poor performance of coordination among Greek agents, this was important and was achieved by ATTIKO METRO SA's ability to make people feel part of a team, and because of the urgency of works;
- for the Randstadrail project the introduction of city regions gave some breathing space to the opposing municipal interests, but the Ministry of Transport had a decisive role in breaking the impasse by providing the funding for the project, being 'the goose sitting on the golden eggs'. This was something the province had not been able or willing to do. The idea for the project was bottom-up but the State was needed to break the deadlock.

Planning and regulatory influences

Various project influences can be attributed to the lack of plans and regulations which negatively affected the projects' achievements, especially regarding their role as 'agents of change':

In the **Greece** cases, for example, the lack of effective and enforceable land-use plans and regulations were cited as contributing to the negative impacts of uncontrolled development in the areas adjacent to both the Rion Antirrion and Attiki Odos projects. There was also criticism that the loose, 'fragile' and incoherent legal framework governing planning provided scope for landed interests to push authorities, politicians and the Ministry towards extending the limits of town plans.

The general lack of plans has also been identified as limiting an MUTPs role as an agent of change, as was the case with:

- areas of land around the Rion Antirrion Bridge;
- the exclusion of key stakeholders from the planning process of projects such as the Athens Metro and HK WHC;
- the inadequate treatment of areas surrounding stations and lack of integration of different modes, reported from the Athens Metro and UK JLE.

On the other hand, positive national examples of regulatory frameworks and procedures included:

- the national legal and institutional framework regulating MUTP decision-making in the Netherlands:
- the long-standing archaeological sensitivity of the Greek Ministry of Culture which imposes strict regulations on excavations.

In the case of the Netherlands, the most prominent laws concerning MUTPs are (i) the WRO (*Wet Ruimtelijke Ordening*) which is the general Act governing spatial planning in the Netherlands; (ii) the Tracewet, which is an act aimed at streamlining decision making on line infrastructure; and (iii) the MER (*Milieu-effectrapportage*) which is the Act governing the Environmental Impact Assessment. An important institutional aspect is that although the Ministry of Transport has the lead, issues of spatial planning have to be coordinated with the Ministry of Spatial Planning and Environment which in general takes an environmental/landscape perspective. And important of course is the prominent role of the municipalities that have to change their Land Allocation Plans and give building permits.

Mega-events and meta-project influences

A number of 4 Tests reports identified mega events, and meta projects as important contextspecific influences.

Mega events had both positive and negative impacts on project achievements – though the perception was often related to a stakeholder's particular objectives. Mega events were not solely large social cultural events such as Olympic Games or national celebrations, but also economic booms/busts (*see Economic Influences above*), significant accidents, new policy/regulations, nationalisation, and changes in government.

Specific examples from the Test 4 returns included:

- Hong Kong Airport Railway: as part of the Airport Core Programme and the symbolic 1997 hand-over deadline, the management of the Airport Rail project delivery was exemplary;
- the London Olympics effectively served to precipitate the implementation of high speed domestic services on CTRL, whilst the Athens Olympics served as a catalyst for both the Athens Metro and Attiki Odos projects;
- the London Millennium Dome and Millennium celebrations fixed a date certain for the completion of the JLE project half way through its implementation phase. This critical contextual impact was seen as either beneficial or problematic, depending upon the stakeholder's perspective;
- the 'Big Bang' financial de-regulation in the UK in 1986 increased the demand for the type of open plan office space available at Canary Wharf, making the JLE an imperative for private sector-led real estate expansion in the area. Similarly, the 1997 de-regulation of the European aviation industry led to the success of the low-cost airline business model, producing a significant competitor unseen by the UK CTRL or Dutch HSL business models;
- the fire at the London underground station at Kings Cross in 1986, and the Clapham Common rail disaster in 1987, did much to change the health and safety regulatory landscape in the UK during the **JLE** planning and construction phases, adding significant cost to the project post ratification;
- the nationalisation of competing private assets: in Hong Kong, after Western Harbour Crossing commenced, Cross Harbour Tunnel reverted back to Government ownership, and with a comparatively very low toll arguably competed unfairly for WHC custom. In this respect the Hong Kong Government was not innocent, but had very few options given its political weakness.

Existing infrastructure can have a significant impact on mega project achievements and outcomes, for example with mega projects paving the way for further mega projects, and also with mega projects forming part of even bigger (meta) projects. Specific examples include:

- **City Link, Melbourne:** the City Link project followed on the heels of the successful building of a new rail line to the northern suburbs (Perth to Joondalup). This project in turn followed the successful 'saving' of the Perth-Fremantle line from threatened closure. It may seem then that the City Link project was the result of a logical progression to shift the city away from its car-dependent form to one more reliant on rail transport;
- Southern Link, Stockholm: a major influence on the Southern Link project was that it was originally part of a larger package (the Dennis agreement) of transport projects in the Stockholm area consisting of both major road investments and investments in public transport. The package was based on the philosophy of more roads as a main solution to the problems of congestion and increased car traffic, which simultaneously would improve the regional environment and lead to better conditions for regional development. A ring road financed by road tolls was at the core of the plans. In the end, the package

was scrapped (in 1997) because of political disagreement and increasing criticism from a variety of different stakeholders. However, several projects in the package remained active and the Southern Link was the first to be implemented. One result was that a main rationale of the Southern Link, i.e. the ring road, became uncertain, which questioned the validity of the project;

- JLE: the JLE could be considered as part of a series of mega projects, planned and realised piecemeal as part of a 'Docklands Development Meta Project'. This could be said to have started with the development of Canary Wharf Phase 1, supported by the Docklands Light Railway and Limehouse Link road scheme. The success of these projects, and the prospect of the Canary Wharf Phase 2 development paving the way for the upgrade of the JLE signalling system, allowed the project to finally reach its specified capacity, almost 15 years late.
- Sydney Cross City Tunnel: a critical context for this project was the fact that several other toll-way projects in Sydney had been successful. This had two effects: first, for a time there was a sense that 'it wasn't possible to lose' on a toll road in Sydney, because traffic congestion is so high; secondly, there was a determination by the government to ensure that it gained revenue from the success of the projects.

The influence of project champions and guardians

A number of Test 4 returns reported the significant influence of project <u>champions</u> throughout the project life cycle, ranging from key political decision makers to public sector employees and academics.

With the **CTRL** and **JLE**, the arrival and influence of (especially) key political champions was significant. These champions both moulded and made use of prevailing contexts to advance particular agendas – for example:

- Heseltine's 'vision' for East London and the Docklands saw the establishment of the LDDC and his direct intervention into the construction of the DLR paved the way for Canary Wharf and the demand to support the JLE Project;
- Prescott's determination to rescue CTRL from financial difficulty in 1997/98; the determination of several public sector stakeholders from LRT/LUL (e.g. Willis, Bayliss, Wilfred Newton) to ensure that JLE survived the financial hiatus of 1992/3, despite their original objections (Bayliss and Willis) to the Waterloo to Greenwich Line;
- Prescott defended the JLE on numerous occasions during its troubled implementation, and was instrumental in bringing in Bechtel to finish the project in time for the Millennium opening;
- the Thatcher Government's overriding techno-rational arguments from competing projects such as Cross Rail in favour of JLE.

Another example was the **Perth to Mandurah railway**, which was seen as the result of a logical progression to shift Perth away from its car-dependent form to one more reliant on rail transport. This impression is enhanced when one takes into account the constant advocacy over some 30 years of 'environment-friendly' railways and 'compact cities' by Professor Peter Newman and others.

Policy influences

Government policy has been stated a significant driver for MUTP developments in the Australian and UK returns, while a lack of relevant policy concerning the long term viability of sustainable projects was seen as an issue with Dutch projects:

• **UK Government policy agenda** - JLE was seen as a means to support the policy of regeneration of the London Docklands, which was part of the Conservatives manifesto to regenerate deprived inner-city areas and to establish a precedent of private sector

finance for transport infrastructure. CTRL was seen as a means to support London's financial position, plug the UK economy more firmly into the EU, and fulfil an important role relative to the restructuring and regeneration of Thames Gateway/East London.

- M6 Toll Road both the UK Government and MEL were keenly aware of the former's determination to ensure that the project would succeed as a 'prototype' PFI' this generated a very favourable negotiating climate for MEL to extract the maximum benefit from the concession that was awarded to them, including duration of concession (50+ years) and ability to regularly change toll levels so as to maximise revenue;
- **City Link, Melbourne:** it happened that the first Australian Labour Party Minister of Transport, following the defeat of the longstanding Conservative administration in 1992, did not agree with the anti-freeway sentiment, and, while not initiating any major new freeways, he allowed a series of relatively minor connections between existing freeways to go ahead at points where congestion had built up, a policy which was continued, and was described by some as 'freeways by stealth'. This policy set the scene for the very large connecting motorways that constituted City Link. Potential major local opposition to significant local environmental detriment was to be appeased both by the construction of sound barrier walls and tunnels;
- **Netherlands:** the dominant economic entrepreneurialism framework in public policy, with its focus on improving international competitiveness and the low profile of previously important elements of social distribution and environmental qualities, was an important policy influence in the Netherlands in the early 1990s.

Influence of political interference

Four Partners cited political interference as having important impacts on project achievements, particularly regarding scope-creep and project delay:

- In the **City Link** project, the active <u>avoidance</u> of political interference was cited as the main reason why there was no 'scope-creep';
- the **Athens Metro** involved substantial political interference in relation to both major and minor project-related issues;
- political interference in Hong Kong's **Airport Railway** led to delays in the first instance. However the project effectively became an instrument in a political dispute which led to significant uncertainty about financing, and delayed the project commencement;
- the **Paris Météor** did not meet its aim of reducing passenger loadings on Line A of the regional express network (RER) other objectives were added because each public decision-maker and financier sought to adapt Météor to its own particular needs.

Political transition

Some important influences were the events surrounding political transition. During the planning stages of an MUTP, this can generate significant levels of uncertainty. However rushing the planning process to avoid such uncertainty can lead to negative outcomes.

Attiki Odos: The changing of governments in Greece has traditionally had a direct impact on the leadership of the Ministry (which is the main protagonist in strategic planning) and a subsequent direct impact on the coherence and continuity of spatial policies. However, it also affected the work mentality within the ministry – this change was seen to be a negative influence on the Attiki Odos project and its associated outcomes.

City Link: When the Australian Labour Party (ALP) lost office to the Liberal Party, the Premier took up the **City Link** project as a signal of commitment by his government to stimulate private investment and lead Victoria out of recession. There were tensions within the ALP about whether the road should go ahead, and, later, tensions created by the project

itself, especially about whether electronic tolling could be made to work inside the timeframe of the project.

Southern Link, Stockholm: The PPP-model was implemented between 1991 and 1994 when the conservative-liberal parties were in power. When national Election Day was approaching in 1994 there was a great hurry to finalise the agreement with the private partner since the Social Democrats had stated that they would stop the PPP-model. Thus, the deal was closed in the very last meeting of the Government when it was already decided that the Social Democrats would come to power. This politically-induced haste affected the outcome of the agreement. Perhaps the most important loss the fast planning process caused was to neglect the objective on regional, local and national integration. The Social Democrats who negotiated with the consortium after the election tried to integrate the project with other rail-bound traffic using the main trunk line. The government had to pay for all changes in physical infrastructure because they initiated the negotiation. When the planning changed to increased integration, other adjustments were made at the same time to make commuting with Stockholm Public Transports possible in the future. Those changes were also funded by the public sector. The additional costs for the government after the election could have been included in the first agreement. Because the solutions became an income base for the Consortium, it is possible that some of the construction costs could have landed at the private side. Instead they got the contract for constructing the adjustments and also the benefits for the extended service.

Political will and decision making

The Partners' give a number of examples where political will has had a significant impact on project outcomes in a variety of contexts.

In Hong Kong, for example, political will extended beyond the resolve to proceed with **Airport Railway** even during times of great uncertainty. This significantly enhanced the airport itself is a positive lesson in acting upon a vision of the future.

On the other hand, the current Hong Kong governance failed to capitalise on the energy, expertise and inputs from various stakeholders for the Hong Kong **West Rail** project. To avoid unnecessary debates and arguments, the government tried to 'stay put', a response not conducive to sustainable development and urban regeneration. If regulatory resolve had followed the government's declared policy to prefer rail over road transport, Hong Kong's Airport Railway might have met its patronage targets, and thus might not be a system with significant excess capacity. This may also have led to reduced road traffic, emissions and lead to a generally more sustainable transportation system. The principal contextual influence resulted from the road transport lobby (the bus companies), seizing the opportunity when the AR opened a year late, and securing franchises to serve the airport. There was little political resolve to reverse these services once AR started operating. The rail service remains subject to this (some maintain unfair) competition.

In **France**, the political non-choice between the two competing Paris Metro projects of the two public corporations led to delays. In 1989, the Prime Minister decided that the two projects should be constructed concurrently. This generated a financial risk and the Region found itself unable to finance another transport project for the following ten years. **Météor** had its two ends severed which meant that it could no longer be extended to join up with Metro Line 7 to the south or to reduce passenger levels on Line 13 to the north. The construction of Météor also had to be segmented into three phases which meant that the works took longer (19 years for nine stations). Each phase also suffered from delays (15 months for Phase 1 and five and a half months for Phase 2).

Netherlands – HSL Zuid: this project was a 'bridge' between left and right of the political divide. Infrastructure was something that is not so controversial from a political party view. It turned out to be very political, however, as the Minister of Spatial Planning decided that this project would be the moment she would make her stand as the defender of the 'Green Heart' (Holland's central green area). Until that time she had very few successes and the Dutch HSL was chosen to get her success. Eventually this led to a deadlock concerning the route through the Green Heart and which eventually resulted in the choice for the tunnel.

2.4.1.5 Social influences

Influence of social history/pride

Aspects of national pride can have significant influences; for example:

- the Rion Antirrion bridge had a historically-rooted unique value in the minds of many Greeks. This was of dual influence - on one hand, this perception promoted the implementation of a project with questionable value for money; however, it also fuelled the state (and the sponsors) of the project with enthusiasm and willingness to successfully implement it;
- national pride surrounding the Olympics and the Athens Metro Greece is a country that is seeking modernization and had a national pride that boosted the Metro project (and the bid for the Olympics).

Stakeholder opposition, conflicts and lobbying

Opposition from users and residents groups can have an important influence on all phases of the project life cycle, and road projects in particular. Not only can public opposition block individual projects in their planning stages for significant periods of time, but also radically influence general development trends at a regional or national level, and, through boycott, affect the success of projects already in the operational phase.

Hong Kong: the pre-1997 pro-development mind-set gave way to a new phenomenon in Hong Kong: civil society: activism against further reclamation and harbour protection legislation, and generally more thoughtful approaches to development. This placed developments that Western Harbour Tunnel Company Ltd may have previously considered certain in doubt, and its economic model seemed irreparably dysfunctional.

Tokyo Expressway: residents who were concerned about the local environment asked for amendments to the City Planning Decisions. The Governor of Tokyo Metropolitan Area stopped most of the planning and construction of major roads including the Express Way project during his governorship between 1967 and 1979.

Cross City Tunnel, Sydney: this project attracted significant opposition from users, after opening. The widely accepted story was that the project suffered a revolt by the people of the eastern suburbs. However the revolt was mostly by motorists who could not travel north-south across the tunnel due to the road closures. One reason put forward for this revolt was that the road was the first toll road affecting the affluent population of Eastern Sydney. A huge public campaign was run by residents' groups concerning the street closures after the tunnel opened. The general tenor of the campaign was that Cross City Motorways (CCM), the company which owned the tunnel, had demanded a series of road closures designed to 'funnel' traffic into the tunnel, because they were losing money due to a general boycott of the road which had occurred because the toll was set too high.

OMEGA Partners also reported that <u>lobbying</u> could have a significant influence on project achievements, particularly in the early stages of the project in order to gain political support for the project, or make significant changes to a project's configuration. Generally, the
impact of the lobbying process has largely positive for project achievements, in particular enhancing project sustainability. The effect of lobbying tends to diminish in later stages of the life cycle. Examples include:

- social sustainability and disabled access on the Athens Metro: the process of designing, constructing and implementing an accessible metro entailed complex interactions among groups with divergent interests, expectations and goals, as well as struggles and conflicts between representatives of disability organizations, politicians, engineers, public administrators, architects and managers of the project;
- the version of JLE which finally began construction in 1993 was born out of private sector lobbying for a second line to serve Canary Wharf in order to foster regeneration and enhance the viability of real estate development. In this respect the private sector led the vision for the effective development of a significant proportion of the Docklands;
- **CTRL:** the lobbying by local councils for stations at Stratford, Ebbsfleet and Ashford to foster regeneration and growth (and, in the case of Stratford and Ebbsfleet, to boost real estate development) had significant impacts on the CTRL project;
- **Cross City Tunnel:** in Sydney, politics is conducted by a wide range of players. Thus community awareness and demands are very important to what projects are proposed, instigated and completed. Traffic congestion is perceived as a major problem. Community groups, where they have been able to mobilise large numbers of people, have been successful in getting projects put forward. On the other hand, the community has been ignored when they raised technical objections to projects.

2.4.2 Chief generic influences on project achievements

The following section focuses on the chief <u>generic</u> influences on project achievements. Unlike the previous section, where many similarities were observed in the various Partner responses to context-specific influences, there appears less similarity in the responses to generic influences. Consequently, most of the latter are elaborated using context-specific examples. The main generic influences are highlighted in bold (with bullet points) in the following pages.

2.4.2.1 Economic influences

Key generic economic influences are presented below, as bullet points (in bold):

- **Misrepresentation of project costs by project promoters:** From the Meteor project: "The project cost was underestimated by the client (RATP) in order to obtain a favourable financing decision from the Prime Minister. Just after the Prime Minister's agreement, the State services learned that the project would cost €228 million more than expected." However, the good relations between RATP's CEO and the Prime Minister contributed to obtaining this agreement, and similarly the public context of the project, because a project financed by public funds and programmed within a planning contract was seen to be sure to be constructed and that the elected representatives would be able to find the necessary financing, even if this took some time. (However, it would be difficult to find this type of situation today in the lle-de-France as it is now the Region itself that analyses the cost of projects submitted to its examination).
- Importance of finding or having funds in order to realise projects, and the requirement for project objectives to be consistent with private sector goals if relying upon private sector project funding: From the Australian City Link "Without funds nothing happens. The focus was clearly on creating a project that really worked. For this to occur in a PPP this meant that it would have to work in terms of private sector goals, namely profitability. This can be seen in the risk allocation that eventually was reached, and the government's focus on getting the technical requirements for the Australian City Link project correct and leaving the 'how' to the contractor. This also

meant keeping the government at bay, out of the way of the private sector which was responsible for the project program. The creation of the single purpose authority and the clear allocation of roles served this purpose"; From the Oresund Link: "A central premise influencing the planning and appraisal of the project was that it had to be profitable. No proper cost benefit analysis of the public welfare effects of the projects was made. To protect Danish interests, given the Danish state's partial ownership of the ship owners operating the northern route in the Oresund, the agreement stated that the setting of price levels on the Oresund Link should accord with the price levels on the ferries"

- Projects are vulnerable to the availability of funds during their life-cycle which can impact on the long term success of the project: The scale of the Perth to Madurah Railway project varied with the availability of money. The program for the project did not significantly slip or advance, except where the decision to take the direct route occurred, and that was mainly because of a major change in scope. To the extent there was financial failure it was a failure to provide funds for all of the opportunities that could have enhanced the project, and this constraint limited the project in some respects. This could be seen as a failure because, by the end of the project, finance was available to put on the 'bells and whistles' for the project but by then it was too late. Also noted by the CTRL and JLE Projects Test 4 returns.
- Project appraisal typically focuses on a limited set of project options too late in the project life cycle. Appraisal should include a number of options and include broader assessment against projects other than infrastructure: From the Perth to Mandurah Railway: "A key criticism of the way assessment for mega projects is conducted in NSW was that it is often limited to consideration of a very limited set of options. Usually both the EIS and CBA are restricted to a comparison of the suggested project with a 'do nothing' scenario, or at best with variants of the suggested project. One reason for this is a staunch belief that PPPs can only be done with projects which are well articulated"; From the Oresund Link "It is also important to acknowledge that the increasing commitment of regional and local public actors in financing megaprojects may involve a conflict with other commitments such as schools and health care, traditionally financed by municipalities and regions. As such the introduction of co-financing models involving several levels of government necessitates a clear overview of possible conflicting interests between infrastructure investments and other welfare economic goals."
- Developments in competing transportation markets are seldom anticipated during project planning: From the Dutch HSL project: "especially in air and car travel, were not anticipated during the appraisal and cost-benefit analyses i.e. that the cost of air travel would decrease as much as it did (30% was predicted, but the actual decrease was significantly greater). This may lead to problems in the operation of the HSL the project has only just started and therefore the effects are not yet clear." A similar case was seen in the CTRL project where the advent of the low-cost airlines business model was not anticipated.
- **Project success can be enhanced with effective policy:** From the Dutch Randstat Rail Project: "Costs (in terms of both money and time) are crucial for achieving transport goals in competing transport markets. In this case the competition is with the car. Wider policies, for instance through parking policy or road pricing, can also be factors in this. The level of congestion is an important determent for a shift to rail transport without congestion, pricing will most likely be insufficient for Randstadrail to win the competition with the car".
- Cost Benefit Analysis has a role in project appraisal, financial management and planning: From the Perth to Mandurah Railway Project: "The project was run to a proper budget that was adhered to. The main contractor was held to a fixed price contract. The project was carefully scrutinized by the Treasury Department from a financial perspective, and a benefit-cost analysis was done for the project to convince Treasury: 'You know, you've got to get the benefit cost analysis done and you've got to convince Treasury and

you've got to find the right way to do it. And we had various attempts at that and it finally got through."

2.4.2.2 Physical influences

• Importance of local conditions, such as geology, hydrology, etc: For example, in the Athens Metro Project, the limited knowledge of ground conditions led to repeated problems in tunnelling.

2.4.2.3 Sustainability Influences

- Sustainability was not an issue taken into account when planning projects pre-1990: From the Météor Project: "These are variable as Météor is an old project as well as being a public transport project. Towards the end of the 1980s, sustainability was not an issue taken into account when planning projects in France."
- Subterranean projects fit well into the urban environment: The French Météor project "fits well into its urban environment because it is underground. It provides a good service to the new districts in southern Paris because its route was studied alongside the planning of these new districts. It does not generate any breaks in the urban environment and optimises travel movements in Paris by reinforcing the metro network grid."

2.4.2.4 Social influences

- The absence of public consultation can generate social risk: From the French Météor project: "A claim made against the 1990 public utility declaration delayed the project by 15 months. This situation was regretted by the client ... This situation in France has now changed, whatever the mode of transport, as a result of the Bianco circular issued in 1992 and the Barnier law in 1995. These provide for public debate concerning the relevance of the concerned project to the local environment. This debate now takes place prior to the route layout and before the public hearings and is accompanied by the monitoring of the State's environmental commitments."
- The role of public participation in a project is often tightly controlled: The Australian City Link Project...."permitted protest only within certain bounds. Propositions for improvement were allowed. Propositions not to build the road were not allowed. It is perhaps this tight bounding of the community input after the decision to proceed had been made, and the subsequent acquiescence of the public to the role they were allocated that led to the eventual acceptance of the road, and limited public protest. There is a need for cooperation in the work to alleviate project impacts and it needs to take place in the hearts and minds of the community."
- Setting the right specifications to measure the scale of impact of a project is not in itself sufficient specification must be backed up with adequate monitoring: From the Australian City Link Project: "In terms of community input the setting of specifications mattered because firstly the EES process, which is the key community consultation process on the effect of the project, never looked at the impact of the project in its entirety. Thus the scale of impact of the project was not actually formally reviewed. Secondly the specifications, while designed to manage the scale of impact (on amenity especially) were completed in some parts of the project, while in other parts this was allowed to slip. Clearly this indicates that setting the right specifications is not in itself sufficient to manage the scale of impact. Management of the contract and ensuring that measures and targets are met is also critical."
- Genuine public participation can reduce negative project impacts: From the Perth to Mandurah Railway: "One attempt at full consultation became bogged down in confusion and was eventually overtaken by the heavy rail group, who influenced planning decisions to get the outcome they wanted. However, where public participation occurred and was

listened to it did influence the Perth to Mandurah Rail project, possibly reducing negative impacts."

• Public participation may not block a politically approved project, but can have a critical importance in mitigating certain impacts: From the Swedish Case Studies: "For opponents to projects it is important to realise that while it may be an impossible task to influence decision makers and planners not to build a project that has been politically approved, the possibilities to influence the design and alignment of the project may be of critical importance to protect environmental values."

Stakeholders

- Definitions of 'public' can change through the life of the project: From the Cross city Tunnel: "Public consultation was associated with the initial forming of the vision through the activities of Sydney City Council in making adjustments to the process and responding to *Heart of Sydney* report. The public in this consultation included pedestrians and road users other than drivers of private vehicles. Later, public consultation came to be regarded as inadequate, with people not aware of impacts. This reflected a shift in who 'the public' is conceived to be. By the time considerable conflict occurred 'the public' had become the private vehicle drivers. This indicates that one of the matters that public officials need to manage is the tendency for creep in who 'the public' is in these projects."
- There are perceived difficulties in determining the appropriate balance between winners and losers: From the UK CTRL Project: "This is important when deciding upon new projects (especially in regard to project impacts which are likely to be difficult to discern and may only arise in the long-term mobility/accessibility."
- Ignoring the view of certain stakeholders during the project decision making process can increase the MUTP risk: From the Swedish Southern Link: "... the whole Dennis agreement could be interpreted as a case of how planning should not be done. Above all the decision to exclude political parties and other stakeholder groups critical to the road projects from the decision-making process can in retrospect be viewed as a mistake. While it did make it possible to close the deal, the same decision can also be viewed as the reason for the collapse of the agreement since it eventually became evident that the views of the excluded groups were quite widespread. In due time this allowed the critics to muster sufficient political support for overturning the agreement." From the French Meteor Project: "The client, a public corporation, showed little transparency with regard to the public financiers concerning costs prior to the public decision, nor with regards local residents concerning the project prior to the works."

2.4.2.5 Institutional Influences

- Forecasts used to support planning and appraisal decisions are significant sources of risk: Example Hong Kong Western Harbour Crossing.
- Poorly conceived, incomplete or limited public-private-partnership arrangements that are inflexible and unable to deal with changing circumstances may be viewed as representing a generic risk: This observation is also from the Hong Kong Western Harbour Crossing and is consistent with the returns from Greece. To quote from the French Meteor Project: "Once the cost of the project was stabilised in 1993, the project budget was well controlled by the client. The problem was that the financial responsibility for the project had not been clearly defined at the time that the initial decision was taken."

To quote from the Australian Perth to Mandurah Railway: "There was some discussion about the contracts, and whether strict enforcement of the contracts was 'reasonable'. The contractor was required to take the risk for somewhat unknown ground conditions and to price on the basis of assumptions. Problems during the execution of the contract, in Interviewee D2P's view, could have been avoided at tender stage, particularly with regard to extensions of time."

- Private sector expertise can have significant positive impacts on project outcomes: From the Rion Antirrion Project: "...the experience and engineering capacity of GTM (Vinci) and other involved parties in the technical domain was beneficial." From the Athens Metro Project: "...the highly qualified personnel hired for ATTIKO METRO SA that converted, to a significant degree, the organization into a learning one the competence of the engineers involved in facing serious technical problems (in both design and construction)." From the Greek Attiki Odos Project: "The fact that the project was procured as a concession PPP which brought into the risk analysis arena a number of experienced actors but at the same time had some negative implications deriving from the fact that the state was not prepared to enter this demanding and complex arrangement – both positive and negative influence."
- **Co-operation between actors can be a positive influence on project success:** The 'cultural compliance' between the concessionaire and the state during the Greek Attiki Odos Project was considered a positive influence. From the Australian Perth to Mandurah Railway: "There is a relationship between cooperation amongst the key players and implementing developments. This relationship is largely a strong recognition by various elements of government that they must work together to get things done."
- Visions pull institutions and stakeholders together across long project life-cycles: From the Australian City Link project: "Courage, vision and leadership are connected, and required of all parties in the project. Leadership was able to articulate a vision, relate it consistently to the project, and define and manage the different roles allocated to players in the project. The vision of the project is part of what pulls everyone working on the project along together. It is not just about big decisions but also about how the daily leadership provides connection to the vision." From the Australian Perth to Mandurah Railway: "Interviewee LP pointed to the difficulty of getting continuity over the life of different Parliaments. Strong leadership with 'vision' is necessary to get the network to work irrespective of the formal bureaucratic structure."
- An established separation between the bureaucratic process and political power can be beneficial to project success: An emergent theme from the Australian City Link was the importance of separation between the bureaucratic process, and the Ministerial power. In the project this separation was maintained through the creation of the Melbourne City Link Authority which managed the process of the negotiations, leaving the Cabinet capable of wielding authority when the process bogged down. This theme of the separation or the different types of power wielded by the bureaucracy and the politicians is a belief that is a widely held in Australia.
- Institutional competence is an important precursor to an MUTP's success: From the Australian City Link and Perth to Mandurah case studies: "There is also an element that seems to suggest that the relationship between private power and program slippage is not so much about power, but about competence (see for example the water in the tunnels problem), and about sufficient financial imperatives (see for example the bridge problem). This suggests that in City Link the private sector's power was a product of its status as the proponent." "There is a relationship between solutions to unforeseen organisational problems and the performance of the organizations themselves. When the former is good the latter is also, and vice versa."
- It is difficult to co-ordinate national enabling procedures with international negotiations: From the Swedish Oresund Link Project: "In this case the difficulties did not influence the outcome of the project but it caused damage to the legitimacy of the planning process on both the Swedish and Danish sides."
- **Debate and controversy should be encouraged:** From the Swedish Link project: "This might lead to a longer and less predictable planning process but the outcome is a better knowledge base for decisions and an avoidance of negative surprises later in the process."
- **Projects are more than just infrastructure:** The Oresund link appears to represent an example of good strategic project management, given that the project managers went

beyond the task of just building a bridge - seen as important for generating a successful view of the project by most observers.

- Alignment of political will, project plans and finance is important set of circumstances for a project to move forward: From the Australian City Link case study: "Program slippage or advancement is related to a wide range of things, not just technical fixes and changes to the program, but relationship building that allows creative solutions to the problems that occur. A key message is that to make a project move forward what is needed is an alignment of political will, project plans and finance. If that alignment has been done well, and the project has been fully scoped before commencement, then, once it begins the project will create its own momentum."
- **Clearly defined roles and benchmarks:** From the Australian City Link case study: "There is a significant relationship between the establishment of clearly defined roles and the performance of organisations with regard to those roles. Organisations should be held to tight benchmarks once they have been given their roles, and it is important for the government not to overstep its role once issues have been allocated to the private sector."
- Political leadership should be accompanied by powerful rationalising narratives and effective stakeholder management: From the Australian Perth to Mandurah case study: "Leadership requires a convincing and consistent narrative to support the project. This narrative cannot be just a story, however compelling, it must ultimately be based on fact. Evidence has to be adduced in support of the narrative, and embedded within the narrative. People need to be told why a project is a good idea. The evidence that could be adduced related to the use of the railway: whether people would use it, under what circumstances, and whether they did use it once the project was complete."

Context

- The 'project delivery phase' is seen as less contextually sensitive than other phases because of the perception that the project is 'frozen': From the UK CTRL case study: "This explains, at least in part, why project managers are believed to be less contextually sensitive."
- Context awareness is critical to all aspects of project planning and delivery: From the UK CTRL case study: "There is a need to take account of the likelihood that many/most contextual elements are likely to change/evolve over the course of the (usually lengthy) project lifecycle."
- Project 'success' can only be judged in light of sound knowledge of the context that prevailed at the time the project was conceived, planned, appraised and implemented: Highlighted in the UK case studies.
- Stakeholder perspectives/motives/agendas, which need to be both clearly understood and acknowledged as changing over the course of the project: Highlighted in the UK CTRL case study.
- Changing contextual elements strongly influence projects: The evolving nature of projects is such that the planning and delivery process responds to the moulding influence of changing contextual elements over time.
- Successful projects are likely to be characterised by planning and delivery agents that possess acute awareness of the importance of context *throughout* the project lifecycle. Examples given in the UK case studies.

Technological influences

• Technological advances are high risk, but can provide innovative solutions to help the project arrive at a viability tipping point: Japanese examples: technological developments allowed the Japanese Metropolitan Line, Shinkansen Line and OEDO Line to be completed.

- Technology is most affective when adopted at the earlier stages of the project life cycle: From the Australian Perth to Mandurah Railway case study: The remedy for poor organisational performance was often technical. Technical interventions provided a solution to political, or organisational problems. However this ability of the technical to resolve the organisational is dependent on the project being in play. Once the project ended the voices concerned with organisational problems had less capacity to call on a technical solution.
- Within the political paradigm (where values might get sorted out) where there are is a high level of tensions between values, technical solutions do not work, are not listened to, and cannot be found: On the other hand where the paradigm is one of technology, the technical solution arises naturally to keep such tensions low (from the Australian Case Studies).

Political influences

- Importantly politics is not primarily about rational argument, it is about building coalitions amongst both persons and *different* rationalities: MUTPs may be shielded from political intervention to some degree, because their very size and scope makes them difficult to change once they have gained a certain amount of momentum. Problems and solutions arise together, just as the scale of the impact of the project, and alleviating its impact also go together. However this relationship is not as direct as might be at first thought. (From the Australian City Link Project).
- **Political vicissitudes can interrupt good planning:** From the Australian Perth to Mandurah Railway: "the power of the project to simply decide the most rational outcome, was limited by other policies that were going on and had to wait for the political process, before heavy rail could claim an outright win"
- The whole MUTP conceptualisation, planning and implementation process is related to the mode of governance in place. From the Hong Kong West Rail case study: "The whole process smacks of 'rational comprehensive planning' of the 20th century, rational by the standards of bureaucrats and engineers and comprehensive as an engineering project. The problem is that the executive-led government, up till this very date, does not seem to realise this issue and has continued to adopt the same mechanism in planning and developing MUTPs. The narrow conception of issues means that many golden opportunities have been lost in promoting sustainable development and regeneration through the implementation of MUTPs.
- Political influence/support is *the* critical contextual factor in all aspects of MUTP planning and delivery and a clear pre-requisite to the successful launch of a project: From the UK CTRL case study.
- The tendency towards 'short-termism' on the part of politicians and civil servants suggests both an inability and lack of desire to effectively scan existing and future context: The UK CTRL case study found "the (political) focus is on defining what is practical and achievable in the short run." From the Hong Kong West Rail project: "Worse still, without a strategic vision for MUTPs and their roles in the macro-strategic territorial and regional context, the implications of changes to these infrastructure projects cannot be appreciated The phased development of West Rail is a case in point."

Planning influences

• Ineffective development plans curtail the ability of an MUTP to act as an agent of change: From the Greek Rion Antirrion case study: "...the lack of an effective development plan for the area around the bridge that could exploit benefits." From the

Japanese Oedo Project: "City planning guidelines that promoted the shift from one-centre to multi-centre urban structure, and coordination with urban development projects such as Shiodome land readjustment project."

- **Masterplans can be used to control project interventions**: From the Perth-Madurah railway project: "There was growing concern amongst planners about the south west corridor, and demands by the population in politically marginal seats caused the State government to act. However, the project was owned by the State government and its agents. Outside political intervention was strictly controlled largely by the Master Plan process which prevented changes to the project plan. Attempted intervention by local councils, developers and community groups, did not lead to political intervention in the project. The conduct of the project reflected the strength of decisions taken by the State government and the railway planners, and the lack of power that others had."
- The lack of thorough MUTP project planning and appraisal can limit a projects effectiveness as an agent of change: From Attiki Odos: The poor preparation of the project with regard to: (a) its tendering and contractual structure; (b) its compliance with the Greek planning and environmental legal framework; (c) studies examining alternative routes and other technical studies on the subject of supplementary works had a significant negative influence.

Historical Influences

• **Projects can have unwritten historical objectives:** From the Rion Antirrion Bridge: "...the historically-rooted unique value that the project had in the minds of many Greeks. This was of dual influence - on one hand, this perception promoted the implementation of a project with questionable value for money, however, it also fuelled the state (and the sponsors) of the project with enthusiasm and willingness to successfully implement it."

Champions

- The role of champions can proved very critical in various stages of the project lifecycle: During the Rion Antirrion project "such people existed on both the state's and the concessionaire's side. They were visionaries, context aware, innovative and capable to inspire teams, orchestrate processes and take the lead."
- Champions delivering a consistent vision are a powerful mitigation against risk: Leadership is linked to the continual carrying forward of the vision throughout the project, through the project teams, and even when things go dramatically wrong. Interviewees mentioned the critical role of the Minister and the top leadership in promoting and 'championing' the project. (Australian City Link project). There was very strong emphasis on the role of political leadership – with all its connotations of power, success and reputations 'on the line'. Many interviewees mentioned the critical role of the Minister and the top leadership in promoting and 'championing' the project. The intervention of the Minister was a demonstration of public sector power, deciding whether projects should or should not go ahead." (Australian Perth to Mandurah Railway).

2.4.3 Principle project 'winners' and 'losers'

Figure 2.54 below shows the analysis of MUTP winner and losers reported in the Test 4 returns. The horizontal axis lists the principal stakeholders types identified as winners and losers across the 24 projects where data was available, whilst the vertical axis presents the percentage of projects where each stakeholder category was considered either winners (green bars) and/or losers (red bars).

The analysis found '**MUTP users**' as the stakeholder group most frequently associated with the concepts of winning or losing. Taxpayers/society, Local Residents, Concessionaires, and Global Environment were identified as the stakeholder groups which made a net loss

from MUTPs. Users, Local Businesses, Consultants, Contractors, Governments, Transport Operators and Regions were found to make net wins. The most consistent winners were identified as project consultants and contractors, whilst the most consistent losers were the Global Environment and Taxpayers/Society.



Figure 2.54 : Principal MUTP 'winners' and 'losers'

The following is a synthesis of the themes and situations related to winners and losers commonly cited for each category of stakeholder as identified by Test 4 returns.

Taxpayers - winners

The line between taxpayer winners/losers was often a fine one. For example, a share of the Southern Link project financed by the City of Stockholm was supported by the selling of public assets (including a public energy company), which could be seen as a loss for taxpayers. However, project proponents argue the project contributed to economic growth exceeding the income generated from owning a public utility company.

Taxpayers - losers

There is a common thread of arguments citing loss due to the opportunity cost associated with excessive capital resources being used for the MUTPs which could have been directed towards more beneficial projects for the country as a whole. This was found to be the case for both Rion Antirion Project, and the CTRL. The Dutch HSL highlights a more local issue related to choice of options: only a very limited section of a population may make use of the dedicated HSL high speed line when compared to alternative project options such as a general increase in voltage and speed on existing tracks.

A second closely related theme is the tax-payers loss due the high price of the planning and construction of MUTPs, and in particular the cost over-runs common with such projects, such as with the Dutch HSL project. Often the loss is further compounded by economic contexts, such as the financial weakness of the Greek state during the time at which it was required to issue state guarantees for the project. Also cited were the extended pay back

periods associated with PPPs such as with the Swedish Southern Link project, which will cost Swedish tax payers SEK 1 million per day for 25 years.

The effectiveness of mechanisms related to taxpayer/societal gain, such as the trickle-down economic effects from MUTPs, are highlighted as uncertain.

Users – winners

MUTPs are most commonly cited by the International Partners as providing users with a greater choice and faster transport modes: for example people travelling between southern Sweden and the Copenhagen area, or between Rion and Antirion who previously had to rely on ferries are considered winners as they now have the option of a more rapid alternative from the MUTP providing a fixed link. The residents of the south western corridor, dispersed in settlements separated by blocks of reserved land, have been major winners from the Perth to Mandurah project. They have been provided with a rapid and efficient means of moving up and down the corridor. However this has complemented rather than replaced their car-oriented mobility habits.

In some instances, the project is cited as a winner for one mode of transport, but a loser for other modes. For example, the Melbourne City link, which reversed traffic calming measures and road closures, meant that the project was a win for car drivers. However, it was a decision taken to the detriment of the hundreds of thousands of pedestrians in the CBD each day, and others in residential streets.

In some instances, the advent of an MUTP has spawned other projects with beneficial knock-on effects for transport users. For example, during planning and construction of the Hong Kong Airport Rail Link (AR), politicians managed to undermine the government's policy preference for rail transport to facilitate the establishment of a regulatory regime that allowed several bus franchises to and from the airport, which were able to out-compete AR on fares. This improved accessibility as the buses operated from more locations in the urban areas than AR, and is presented as a necessary concession to lower-income members of the community, but ultimately reduces the environmental sustainability of the project.

Users – losers

In some cases users are losers as their aggregate travel times were not decreased, but increased by the project. For example, for the Melbourne City Link Project, time spent in travel throughout the inner and middle part of the city did not diminish but increased. Congestion is already plaguing the Athens Ring road, and design faults in the Swedish Southern Link are causing the tunnel to be closed when heavy traffic overwhelms the ventilation system.

Losers also include those who suffer reduced accessibility as a result of the project. A prime example is the Dutch HSL project where lower income travellers are losers because the high speed line will lead to a reduction in the normal connections on the same route in order to attract more travellers to the HSL. Low income travellers who cannot afford to take the HSL will have to make do with fewer trains and longer travelling times. In a similar way those people who formerly used parts of a MUTP system for a lower price are considered losers, for example sections of the Melbourne City Link were originally free of charge prior to the advent of the project, but now users are obliged to pay tolls to access the same sections. However, the true financial loss is unclear as these same people may have benefited from shorter journey times and greater connectivity.

Local residents – winners

Local residents were found to benefit when local environments improved, especially the reduction of noise and fumes from motorway traffic, such as observed by the Swedish Southern Link Project. Or in some cases inner city residents in some neighbourhoods benefited from a reduction of through freight traffic due to the Melbourne City Link.

Land-value uplift is cited in a number of returns as a significant benefit to local residents.

Local residents have also benefited from increased accessibility. In the case of the Oresund Link, for example, access to lower cost housing as Danes moved to Sweden while retaining their jobs in Copenhagen, or the case of the Attiki Odos, access to enhanced recreation areas. The Rion Antirion bridge provided a safe, well-constructed and operated highway that gives much better accessibility to the Peloponnese and Athens (with reductions in travel times), attracting Patras inhabitants for second housing and in a few cases for permanent residence. The Perth-Mandurah railway gave the residents of the south western corridor, dispersed in settlements separated by blocks of reserved land, a rapid and efficient means of moving up and down the corridor.

Local residents – losers

Most negative impacts on residents were those regarding the local environment, For example people living in localities through which Melbourne City Link passed lost some fraction of their local environmental quality, though there were serious attempts to reduce these losses. The central area environment of Melbourne and its users were also loser where sustainability measures were considered to be the foundation of the project such as the proposal to reduce traffic on the surface, and reclaim road space for pedestrians, public transport and cycling. These measures were in large part abandoned following protest by drivers through the Eastern Suburbs after the tunnel opened.

Some returns highlighted how local residents were negatively affected by the lack of information about the project and limited engagement in decision-making such as during the Greek Rion Antirion project.

Residents displaced by the infrastructure projects were also seen to lose such as in the case of CTRL, or in projects related to JLE. However the Hong kong West Rail study found displaced residents could be losers or winners depending on their own perspectives. Many affected members welcomed the compensation received while others mourned over the loss of their ancestral homes.

In the case of high speed links, people living close to the line, but not close to a station, are obvious losers from the line as they have the nuisance but not the benefits, such as in the case of the CTRL, Dutch HSL and Japanese Shinkansen Projects.

Business (local) – winners

Businesses were seen to benefit from improvement in accessibility, such as employers in Denmark gaining access to a larger labour force via the Oresund Link, or Employers at Canary Wharf gaining access to workers from the South East of England via the JLE.

Companies gained from improved access to a wider geographical market. For example, Arlanda airport and the aviation business were winners since the airport link increased accessibility to the airport and made it more attractive. For the Melbourne City Link, major winners were the occupants and developers of the Docklands precinct, and the freight industry almost certainly benefited. City Link was alleged to create economic benefit of

about AU\$155 million per annum, with a five-fold multiplier effect on the surrounding economy. In the Netherlands, Schiphol Airport was also viewed a winner due to its greater accessibility to the market. The airport is now easier to reach from the southern part of the Netherlands which might attract new travellers. Although the HSL was built with the argument that it would reduce air traffic, it might actually do the opposite.

In the case of CTRL, HSL and Airport Link, business and high-income travellers were winners since they are the ones who mainly use the link. They have received a new high-quality transport mode which they can afford.

Real estate development companies: in Hong Kong, following MTRC's rail-property model, all Hong Kong's major real estate developers benefitted substantially from the large-scale developments that were required at Airport Railway stations.

Business (local) - losers

Local businesses can lose due to increased competition. This can be acute when the business is providing an alternative mode of transport which has been effectively superseded by the MUTP infrastructure. For example the ferry operators that previously serviced the route between Malmo and Copenhagen were put out of business by the Oresund Link. The ferry operators competing with the Rion Antirion bridge are experiencing a steadily shrinking business.

A more indirect effect that has been realised slowly concerns Danish retailers in the Copenhagen area who have experienced increased competition as a result of exchange rates and the improved communication possibilities.

Re-distributional effects can create losers. More long distance travellers have gained accessibility via the Arlanda Link which has affected several local airports in Sweden now driven out of competition by the train.

Business (global) – winners and losers

Global business was found to be one of the highest net winners across the 24 project studies (see figure 7.51 above). For example, the Oresund Link was seen as beneficial for an informal network of actors termed as a 'development coalition' which includes (amongst others) construction companies, consultants, financiers and real estate who have been, or are involved in the development plans taking place. The Melbourne City Link consulting firm which designed and managed the project and the main contractor was winners. Private sector firms involved with the Rion Antirion Bridge were seen to gain wealth, expertise, and penetration into the Greek market, whilst improving their image and credentials.

Relatively few projects were reported where contractors made no profit or suffered a loss from the involvement in the project.

Transport operators - winners

Network development: the Oresund Link facilitated the introduction of a new regional train system which was clearly important for the development of the public transport system (above all in Scania). Both Skånetrafiken and DSB (the public transport authorities in Scania and Denmark), as well as a wide range of public transport operators were considered winners.

Support of complementary modes of transport: Copenhagen international airport was considered a major beneficiary from the Oresund Link.

Network Integration: the Perth to Mandurah railway has provided residents with a more efficient system of rail based public transport than other major cities in Australia (albeit still much smaller in scope than that of Melbourne and Sydney). The degree of integration of transport modes (bus-rail) in the western corridor is a significant spin-off of the rail projects.

Transport infrastructure operators: as in the case of the Athens Metro, they gained expertise in management, operation, contactualization of risk, contracts and technical knowledge.

Prestige: Hong Kong AR is an internationally known service which draws continued praise from international travellers, and has become an international benchmark for many new and existing airports in attempts to create similar services;

Transport operators – losers

Where transport operators have lost, it has been for the most part due to difficulties in making their infrastructure service profitable. For example the Arlanda Link lost money as the operators were seen to lack previous experience as an operator. In 2004 they sold the operation to an Australian company for a comparably low sum and since then the service has been profitable.

The Hong Long Airport Railway Company developed a functionally efficient and exemplary transport project, but it is operationally underachieving in financial terms. Despite the resolve to complete the project, late completion provided the bus companies to establish a foothold on the airport route and undermined its feasibility.

From the Dutch HSL project, the concessionaires (KLM-NS) might have been winners. They were awarded the operation of the line and the line was constructed for them. They might still become winners, but currently they seem to have overbid in the tender and will not be able to make a profit from operating the project.

Regions – winners

Regeneration: the French Meteor project, for example, has contributed to restructuring the districts in the 13th Arrondissement of Paris. New buildings have been built and new jobs have been created.

Economic Development: Rotterdam is seen as a big winner because of its connection with the HSL, making it better connected with other city centres in Europe and Schiphol Airport. Similarly, the economy of London and the South East is seen as being fundamentally supported by the advent of CTRL, the developments it has spawned and the opportunities it provides in relation to the restructuring and renewal of the Thames Gateway

Regions – losers

Examples of regional 'losers' include (i) The Hague – from the HSL project; and (ii) the Province of South Holland – in the Randstat Rail Project.

The Hague was the loser in the HSL Zuid decision-making process as it did not get a direct stop on the HSL line. It has to make do with a shuttle connection. As the political capital and the fourth largest city in the Netherlands, it sees the high speed train line travelling at about 15km to the east of the city. Zoetermeer also has lost its direct rail connection with Rotterdam. The Zoetermeer connection was the least cost-effective and least interesting for

the bigger municipality of Rotterdam. When the Ministry of Transport decided the project had to be far less expensive, Zoetermeer lost out.

With the Randstat Rail Project, the Province of South Holland was a loser because it took a long time to break the impasse of local providers with different infrastructure interests and the province was powerless in this. The introduction of the city regions and the South Holland Province's proven inability to build bridges further eroded its power over and respect from the municipalities.

In the planning of Hong Kong WHC, the project missed important opportunities to facilitate urban regeneration through careful and integrative WHC access road planning, particularly in West Island.

Governments – winners

Examples of the government as winners are provided by Greece – e.g.:

- the pride and reputation gained from the implementation of a technically complex transport project such as the Rion Antirion Bridge;
- the supply of key strategic infrastructure, for example the Rion Antirion bridge which provided an important link in joining the motorways of PATHE and Ionia Odos which are under construction and are designed to be integral parts of the national motorway network.

Government – losers

Examples of government as losers include the Hong Kong Government's decision-making related to the Western Harbour Crossing. In this case the Government had the option to increase unfeasibly low tolls at CHT and rebalance traffic flows and so improve WHC's competitive position and revenue. In doing so it would have had to face an embarrassing Legislative Council debate, and push through a measure which was seen to advantage WHC at the expense of society. Given the context in which this situation prevailed, it was clear that the Government did not have a feasible option for escaping from this lose-lose situation.

With regards West Rail (Hong Kong), the Legislative Council (LegCo) succeeded in drawing the community's attention to various management issues. However, LegCo had contributed to energy-consuming debates but failed to play a mediating role to bring different stakeholders together for a positive outcome.

Environment (global) – loser

The global environment is seen as one of the greatest sum losers from MUTP projects. For example, in the case of the Oresund Link the main loser will be the environment. The bridge has meant a marked increase in travelling, both by train and by car, and both for work and leisure purposes. The increase in transport resulting from the link will increase the pressure on local land areas and will contribute to increased emissions of CO2.

The Arlanda Rail Link represented a missed opportunity. Here the environment is both a loser and winner. It won in the sense that rail transport is better than road and a modal shift is therefore positive. It lost since the modal shift to rail has not been as big as it could have, and since the link essentially means greater access to the airport and more travel by plane.

Melbourne City Link: in general it can reasonably be said that the environment was a major loser here. There is really no question that a continuous programme of motorway building

increases the level of emissions from traffic, as more cars and trucks take the road, and the length of journeys increases.

2.4.4 Opportunities and threats to project development: the role of external factors such as blocking and inducement mechanisms

Few responses were received from the Country Partners regarding tackling the opportunities and threats to project development and the role of external factors as blocking and inducement mechanisms. Responses from the Greek and UK teams in particular are summarised below.

Innovation

Market practices and competition regimes can generate technological and engineering innovation in MUTPs. (Rion Antirion). Technology has been a blocking mechanism to the JLE and LUL: The signalling systems developed for the JLE has been a costly venture, but there is an opportunity to install such systems over more of the London Underground Network.

Trust

The cultivation of trust, which can prove extremely critical for a project's success, is achieved through the existence of some planned conditions but also by chance. (Rion Antirion)

Competence

(Lack of) knowledge proved a blocking mechanism to the development of the JLE by London Underground Ltd. The knowledge gained whilst planning and building the JLE has updated a number of institutions whose prior capability in the delivery of underground lines had been allowed to lapse. The knowledge 'sea-change' provided by JLE is a valuable asset, and should not be allowed to deteriorate again. For example, effort should be made to update necessary standards in line with new safety standards.

However, some of the (negative) lessons learnt from the JLE regarding public sector management have had detrimental knock-on effects – such as encouraging the government to implement privatization of the underground.

Retrofit of projects

Another opportunity available to MUTP's is the scope for improvement through 'retro-fitting'. With the JLE, for example, there is further potential for urban regeneration by the extension of the line. The JLE could potentially be extended to Hainault, and also a spur constructed to Thamesmead, an area of London with a distinct lack of rail provision. Other 'retro-fitting possibilities include further development of feeder routes to the underground stations, and improve links with the new Cross rail project.

Risk management as part of wider strategy

Management of risk, uncertainty and complexity (RUC) should be focused on strategies and plans rather than projects - otherwise, RUC management will most likely be incomplete and ineffective. This is particularly important when there is a need to manage wider risks related to the impacts of projects on sustainability. (See the Rion Antirion project, for example).

Clear governance structures

The human factor is absolutely critical in RUC management. Project champions and inspired teams that coalesce around them can facilitate communication and improved performance, even during the most demanding and difficult stages in the project lifecycle. There needs to be governance mechanisms to clearly identify these key actors, to entrust decision-making power to the critical non--political players and to protect the important political decision-makers from intra-polity antagonism.

Long term vs. short term gains

Political gains are not necessarily compatible with sustainability demands. A widely communicated project has a much better chance to deliver sustainable outcomes. MUTPs are political projects and are confined to a political appraisal where the political gain is the first priority. However, political gain is not always related to the long-term national benefit. To give one example, the success of Canary Wharf and JLE has increased the UK exposure to the detrimental effects of the cyclic nature of financial markets and financial services.

2.4.5 Summary of key findings from Test 4

A number of key generic and context specific influences on project achievements were indentified from the responses to the Four Tests from the International Partners and the OMEGA UK team. As explained in the text, the characteristics of the 'generic' and 'context-specific' influences sometimes overlapped or were inter-linked. The main influences are summarised below.

Key context-specific influences

These were identified as follows:

- the geographical/geographical characteristics of the region in which the MUTP was to be developed. Difficult terrains and heavily populated areas both decreased project options and increased costs due to the complex engineering solutions required;
- economic influences related to both: boom/bust cycles, which could act as both a catalyst or constraint to the project depending on political contexts; and the requirement for credible financial backing to ensure the (political) viability of a project;
- environmental sustainability can be a key project objective;
- institutional influences include the need for a strategy and vision, preferably delivered by a strong government or project promoter;
- the relationship between traffic forecasts and actual project patronage was seen as a strong influence, with both over-estimation and under-estimation of patronage both leading to poor project performance under certain contexts;
- levels of stakeholder/institutional competence could act to both increase or mitigate risk: public sector institutions in particular could be either highly competent, choosing to rely upon their own experience to mitigate project risks, or lack the basic experience and capacity required to undertake an MUTP. In the latter cast the private sector tended to provide the expertise required to fill the public sector capacity gap;
- levels of institutional fragmentation could exert both positive or negative influences of project success, highly fragmented institutions could cause significant levels of delay and uncertainty, whilst contextually insensitive cohesion was also reported as damaging to projects;
- the regulatory environment was seen as influential, especially regarding situations where
 a lack of enforceable land use plans encouraged uncontrolled development around new
 infrastructure projects;

- a series of mega events where identified as influential, ranging from large scale social events, deregulation, regulation and natural and man-made disasters;
- project champions both moulded and made use of prevailing contexts to further particular agendas;
- politics and policies: policies could be a key driver in project promotion, but can be detrimental to certain project objectives; politics can interfere with MUTPs, leading some countries to construct political firewalls around projects where possible; times of political transition can create high levels of project uncertainty;
- lobbying can have a powerful influence on project objectives, helping to mould and improve a project by making it more socially sustainable. Lobbying often fails to stop MUTPs with political backing.

Key generic influences

The key generic influences on project achievements were identified and grouped under main categories, as follows:

- economic influences;
- physical influences;
- sustainability influences;
- social influences;
- institutional influences.

Winners and losers

A synthesis of winners and losers according to various categories of stakeholder was undertaken using the Test 4 returns. The most frequently cited category of 'winners' was the users of MUTP infrastructure, followed by the government. The largest category of losers was found to be local residents, also followed by the government. The largest imbalance between winning and losing was observed with consultants and contractors, who tended to feature mainly as winners; and with the environment which tended to feature mainly as a 'loser'.

Opportunities and threats to project development: the role of external factors such as blocking and inducement mechanisms

Few of the Test 4 returns featured an analysis of opportunities and threats to MUTP project development. From the two teams who carried out this analysis, the following themes were identified:

- Innovation a significant tool to mitigate project risk, although innovation was also identified to harbour significant levels of risk if applied without adequate recourse to innovation risks involved.
- **Trust –** building trust between stakeholders can be critical to project success.
- **Competence** projects often commence without adequate levels of knowledge, and once this knowledge has been painfully built during the MUTP process, it is often left to lapse by the public sector, whilst it is treated as a valuable commodity by the private sector.
- **Retrofit –** MUTPs are developed with only limited regard for later retrofit possibilities.
- **Strategy** stakeholder strategies vary according to their objectives. Most political and promoter objectives are short term, whilst most user and social objectives are long term. This is important as most of the power within the MUTP stakeholder group lies with politicians and promoters.

3. Sensemaking Report on pre-hypothesis research data relative to pre-determined project typologies

As noted in Section 1 above, at the time of compiling this Final Report the Sensemaking Report from Cognitive Edge pty is still awaited.

4. Key themes derived from OMEGA MUTP case study analysis and findings

4.1 Introduction

The purpose of this section of the Final Report is to present those key themes derived from the OMEGA 1 Project that are particularly pertinent to MUTP planning, appraisal and delivery. The OMEGA 1 Project, entitled "Improving the treatment of complexity, uncertainty and risk-taking in the planning of Urban Mega Transport Projects: Lessons from other disciplines and professions", was completed for VREF in 2008. It drew on key insights from a variety of disciplines in which concerns about risk, uncertainty and complexity are at the heart of decision-making processes (e.g. the military, banking and public health). The OMEGA 1 Project concluded with a number of key lessons for MUTPs and these form the basis for the themes presented in this section - although it should also be acknowledged additional insights have been included from the OMEGA 1 Project where these are deemed relevant to MUTP planning, appraisal and delivery against the background of the Centre Team's experience in relation to the UK case studies.

The themes presented below represent a key tool in the synthesis work for OMEGA 2 in that they provide 'lenses' through which to examine case study and country-based findings in regard to the Overall Research Questions and Hypotheses and the lessons, and loci around which to cluster such findings - as shown in Sections 5 and 6 below. Twelve main themes have been selected with this in mind. These are supported and supplemented by a series of 'sub-themes' which help to explain in more detail the issues under consideration (the main themes and sub-themes are listed in Table 4.1 for ease of reference).

4.2 Theme 1: Determining success and failure

Sub-theme (i): key challenges in judging success and failure - the changing demands placed on MUTPs can make it excruciatingly difficult to judge project successes and failures.

Sub-theme (ii): differing perceptions of success and failure - aall decisions are made based on an individual's or group's perceptions of context and the levels of RUC prevailing (or anticipated) in that context at the time of making such decisions. Moreover, MUTPs are perceived as different things to different people, depending on their responsibility/ involvement with/ in the project and their training and interests. These different perceptions impact on judgments made about the 'success' and 'failure' of such projects; even their very definition.

Sub-theme (iii):the importance of defining winners & losers - ddefining 'winners and losers' is a key foundation for judging 'success or failure'. Additionally, the identification of potential MUTP 'winners and losers' must take account of the likelihood that these will change over time and this is also is critical in determining 'success and failure'.

4.3 Theme 2: The need for strategy¹¹

Sub-theme (i): MUTPs as agents of (strategic) change - planners, appraisers, delivery agents and operators need to consider MUTPs as more than 'projects' since they are

¹¹ A 'strategy' is here defined as a "plan that 'joins-up' major goals, policies and actions into a cohesive entity";.

often 'strategic change agents' that have far reaching spatial, social, economic, environmental and other impacts at different phases of their project lifecycle. As a minimum, MUTPs represent a bundle of projects (programmes) and at a maximum are a bundle of mega projects which may be seen together as 'meta project' (i.e., a project associated with several accompanying plans/programmes). The latter clearly require considerable strategic thought at the outset and subsequently on an on-going basis.

MUTP planning, appraisal and delivery strategies need to identify which forces of change they are trying to influence or harness. Here, it is presumed that the vision(s) of sustainable development is the 'overarching vision' to which MUTPs are expected to contribute and that the harnessing of any forces the project musters to this end can only be considered desirable. Sustainable development frameworks generated and enforced internationally, nationally and locally can act as effective guidelines for these efforts if accompanied by appraisal and performance indicators and enforcement legislation.

Of particular importance, given the nature of many/most of the OMEGA case studies, is the relationship between 'strategy' and forces of change. As noted in OMEGA 1, MUTP planning and delivery strategies need to identify which forces of change they are trying to influence or harness.

MUTPs themselves may also positively contribute to the pace of change. This is particularly important given the likelihood that inadequate sense-making of context very often later leads to dysfunctional developments - both in relation to later phases of the project lifecycle and in respect of changes that occur in city and regional systems after MUTP implementation (OMEGA 1)

Main theme	Sub-theme
Theme 1: Determining	(i): key challenges in judging success and failure
project success and failure	(ii): differing perceptions of success and failure
	(iii):the importance of defining winners & losers
Theme 2: The need for	(i): MUTPs as agents of (strategic) change
strategy	(ii): the need for flexible, robust and adaptable strategies
	(iii): monitoring of strategy components
	(iv): project freezing
	(v): clarity of visions, goals and objectives
	(vi): strategy components are difficult to identify and quantify
Theme 3: Engaging with	(i): stakeholder relationships
project stakeholders	(ii): the ability to accurately analyse all stakeholder motives,
	agendas and impacts
	(iii): consensus building with stakeholders
Theme 4: The need for trust	(i): trust, credibility and transparency in dealings with stakeholders
and transparency	
Theme 5: The importance of	(i): the need for full access to relevant information
access to relevant	
information	
Theme 6: Issues associated	(I): MUTPs as closed/open systems
with tools, techniques &	(ii), model use and limitations
approaches for forecasting,	
Thomas 7: The need for	(i): any among regulation and RUC
appropriate governance 8	(i). governance, regulation and ROC
rogulatory framoworks	
Theme 8: The importance of	(i): why context matters
context	(ii): The fluid and evolutionary nature of context and its impact on
Context	MITP nlanning appraisal and delivery

Table 4.1: Key themes and sub-themes

	(iii): 21stC pace of change as a key contextual influence
	(iv): Context monitoring and the project lifecycle
	(v): Institutional capacity as a key contextual influence
	(vi): Political influence as a key contextual driver
	(vii): Mega events as critical contextual influences
	(viii): Serendipity and 'happenstance'
	(ix): Longevity of project lifecycle and relationship with context
Theme 9: The perception,	(i): generic risk sources
assessment and treatment	(ii): the perception, nature and assessment of RUC.
of risk, uncertainty and	(iii): responses to RUC
complexity	(iv): risk monitoring
	(v): innovation & risk
	(vi): drivers of uncertainty
	(vii): complexity drives uncertainty
	(viii): the ability to 'control' project planning, appraisal and delivery
Theme 10: The role of	(i): can SDVs currently provide appropriate frameworks for MUTP
sustainable development	planning, appraisal and delivery?
visions and challenges in	
MUTP planning, appraisal	
and delivery	
Theme 11: The need for	(i): the need for project-based lesson learning and sharing
lesson learning/sharing	
Theme 12: Enhancing skills	(i): the need for enhanced skills and competencies in MUTP
& competencies	planning, appraisal and delivery

Sub-theme (ii): the need for flexible, robust and adaptable strategies - strategies for the planning of MUTPs typically need to be flexible/adjustable and robust, paying due attention to short, medium and long term consequences *simultaneously* with mid-term measures acting as the bridge between short term aims and long term aspirations. Changes in context brought about by such influences as changing stakeholder positions in response to changing international, national and local policies and enforcement legislation are also critically important. As a consequence of the above, as already noted, highly prescribed 'blueprint' approaches to MUTP planning, appraisal and delivery are too inflexible, contextually insensitive and are rarely appropriate over the project lifecycle.

Sub-theme (iii): monitoring of strategy components - all strategy components need to be constantly monitored and analysed during the different phases of the project lifecycle.

Sub-theme (iv): project freezing - any strategy for planning MUTPs needs to take a practical and realistic view of when the MUTP design work is to be 'frozen' as a basis for providing the blueprint for implementation and funding. Once constructed and operational, it is also important for MUTP planners and managers to understand the importance of 'defrosting' this blueprint so that subsequent project developments can naturally adapt to changing forces, influences and needs. These are among the most difficult and important decisions of MUTP stakeholders.

Sub-theme (v): clarity of visions, goals and objectives - an 'effective' strategy is one that achieves desirable (political) effects without incurring disproportionate costs (both monetized and non-monetized). Planning strategies for MUTPs need to balance requirements for implementing a vision for the project and its accompanying spatial and temporal contexts with the practical requirements associated with the efficiency of services offered, their cost ceilings etc., and of course, the resources (including institutional and regulatory support) available to deliver the project. In this regard, it is important to acknowledge that for PPP/PFI projects, private sector goals and objectives may well not

naturally align precisely with those of public sector sponsors. This is so because the private sector is typically driven by short-term interests, whereas, the public sector has expectations that are usually longer term in respect of desired outcomes. Achieving consensus in this context is difficult but invaluable. Because the private sector especially values 'certainty' on the part of public sector delivery this consensus can be facilitated by government introducing policy and regulatory frameworks that reduce uncertainty for private sector investments and operations.

In the early planning stages, there should be a clear statement of MUTP goals and objectives, roles and functions, appraisal and evaluative criteria, key input assumptions and potential impacts.¹² These need to be properly disseminated to all project stakeholders and thoroughly discussed with all impacted stakeholders.

Sub-theme (vi): strategy components are difficult to identify and quantify - although perhaps unpalatable, it is important to concede that many of the strategic components of MUTP planning, appraisal and delivery (and of the project itself) are often very difficult to identify or quantify. This is true both at the outset of project planning and throughout the project lifecycle. This is so because of the complexities associated with 'open' and 'complex' systems. Impacts of MUTPs, in particular, may only emerge over time. They are frequently difficult to discern, as are tipping points when new ideas and methods for project planning, appraisal and delivery emerge and as major shifts in policy and economic developments transpire.

4.4 Theme 3: Engaging with MUTP stakeholders¹³

Sub-theme (i): stakeholder relationships - relationships among stakeholders can be considered a critical factor in reducing some aspects of RUC attributed to various stages of an MUTP's development. Trust, credibility and transparency are necessary factors towards building stakeholder relationships and facilitate consensus building and risk sharing.

Sub-theme (ii): the ability to accurately analyse all stakeholder motives, agendas and impacts - the ability to identify and understand the motives, beliefs and values of the wide range of stakeholders involved in or impacted by MUTPs is extremely difficult, but nonetheless vitally important. Arguably, stakeholder perceptions about 'the project' and any accompanying development including restructuring and regeneration initiatives, represent the most powerful contextual force for MUTPs that will undoubtedly impact over the whole project lifecycle (albeit to differing degrees). For this reason, the constant scanning of stakeholder groups, organisations and networks over time, in order to determine their agendas, willingness to commit, and ability and capacity to exert effective influence, will remain critical before and after key decisions are made.

Stakeholder contexts can be especially fluid and are therefore a major source of RUC. Stakeholders and stakeholder groups/networks change in response to different perceptions about the nature, scale and impacts associated with MUTPs over the course of the project

¹² This statement should be read in parallel with those grouped under Theme 8 (Context) which indicate that visions and objectives may need to 'evolve' over time in response to contextual change in certain circumstances.

¹³ The Oxford English Dictionary defines a stakeholder as a person or company, etc., with a concern or (esp. financial) interest in ensuring the success of an organization, business, system, etc. (OED,2009) The origin of 'stakeholder' in management literature can be traced back to 1963, when the word appeared in an international memorandum at the Stanford Research Institute (cited in Freeman 1984). Stakeholders were defined as 'those groups without whose support the organisation would cease to exist'. More recently Freeman (1984) defined stakeholders as 'any group or individual who can affect or is affected by the achievement of the firm's objectives'.

lifecycle. New foci and agendas also emerge over time resulting in the need for the project to evolve.

There are limits to adopting a comprehensive approach. The desire emanating from comprehensive analyses to identify *all* potential stakeholders that might impact on, or be impacted by, MUTPs must clearly be tempered by an appreciation of the practicalities involved, especially given that many potential impacts of such projects are likely to remain unknown or unknowable for some time after their completion.

MUTP stakeholder contexts that ultimately affect their decisions and commitment can be especially fluid. They are, as a result, a major source of risk, uncertainty and complexity in project development. Stakeholders and stakeholder groups/networks, furthermore, change in response to different perceptions about the nature, scale and impacts associated with MUTPs over the course of the project lifecycle. New foci and agendas also emerge over time resulting in the need for MUTP sponsors to provide the time and space for the project to evolve (breathe).

MUTPs must have capabilities in place to allow the constant scanning of stakeholder groups, organisations and networks over time, in order to determine their willingness, ability and capacity to exert effective influence on key decisions.

Sub-theme (iii): consensus building with stakeholders - consensus-building at the preliminary stages of MUTP planning and formulation stages is typically essential for all such projects. Here, the ability to scan and understand stakeholder policy frameworks, agendas and the positions they have adopted over time to MUTP development is imperative.

Early stages of MUTP planning require consensus building within and between stakeholders who may at the outset be potential allies or adversaries. The aim should be to avoid adversarial situations if at all possible, but they are bound to occur as win-win outcomes are not always possible.

4.5 Theme 4: The need for trust and transparency¹⁴

Sub-theme (i): trust, credibility and transparency in dealings with stakeholders - relationships among MUTP stakeholders are critical factors in reducing aspects of risk, uncertainty and complexity in decision-making attributed to various stages of an MUTP's development. Of particular significance here is the transparency in the interaction of stakeholders and the role of trust. The building (and sustaining) of reputation and trust is vital in all aspects of MUTP stakeholder relations. Early and sustained flows of information from MUTP planners and deliverers to those impacted by the project enhances trust, builds reputations and develops support – vital ingredients of the viability of MUTPs where joint ventures are critical to the success of the project.

For MUTPs to be implemented successfully, their planners, appraisers and deliverers need to identify which key decisions require a high level of trust and ensure this is delivered. This calls for a differentiation to be made between trustees and trustors (i.e., clarification of who is responsible for delivering the trust and those who are to expect it is

¹⁴ Trust: To have faith or confidence in; to rely or depend upon.(OED, 2009)

Transparency is defined by the Oxford English Dictionary as the quality of being easily seen through, recognized, understood, or detected; manifest, evident, obvious, clear (OED, 2009). In the context of MUTPs we see transparency to mean 1) A Minimum degree of disclosure to which agreements, dealings, practices, and transactions are open to all for verification. 2) A Lack of hidden agendas and conditions, accompanied by the availability of full information required for collaboration, cooperation, and collective decision making.

delivered). It is significant here to note that success reinforces trust (and vice versa) and that the higher the risk, uncertainty and complexity associated with a particular action or decision, the higher will be the need for trust to be honoured and delivered.

As well as trustees and trustors, MUTP 'winners' and 'losers' must be identified as part of the project scoping and appraisal process. The identification of potential MUTP 'winners and losers' and how they change over time and space/place is *critical*. This is especially important for efforts in making judgements about the success of such projects. It represents a key basis for relations with stakeholders since MUTP 'winners' are often seen as those that are clustered around important project nodes (i.e. line-haul termini, access points etc.) and thus benefit from enhanced services, property price uplift and environmental upgrading.

4.6 Theme 5: The importance of access to relevant information¹⁵

Sub-theme (i): the need for full access to relevant information - gaining insight into the operations of a MUTP will always help reduce risk. Understanding the dynamics of the context of such project operations (and their impact one upon another) highlights the critical importance of possessing *relevant* information about the dynamics of these contexts as a potential determinant to project successes.

Decisions made under partial and especially inadequate information expose a project to the influence of uncertainty. The more knowledge available about the project and its context, and the interface between the two, the less uncertainty and hence the less risk surrounds decisions.

4.7 Theme 6: Issues associated with tools, techniques and approaches for forecasting, appraisal and evaluation

Sub-theme (i): MUTPs as closed/open systems¹⁶ - systems must be in place to allow **MUTP planning, appraisal and delivery exercises to be treated as 'open systems'** that see the project and its interaction with 'context' as exploratory and almost organic, and which allow for unexpected outcomes to become recognized and accepted as part of an 'emergent order' This treatment of MUTPs (and sometimes their contexts) as largely 'closed is done against the background of an adoption of essentially linear (sequential) management framework and logic of the type where certain components of the MUTP are 'frozen' during different phases (to make implementation more comprehensible) often for longer periods than is desirable irrespective of the downstream ability to respond to changing contexts.

MUTPs are frequently planned, considered and operated as 'closed systems'. Reality, however, suggests that MUTP planning (especially) and delivery (also) are subject to manifold contextual influences that make detailed control on all fronts difficult if not impossible to achieve. MUTP planning, appraisal and delivery exercises should, therefore be

¹⁵ Information can be defined as a collection of facts or data which, is specific and organized for a purpose, is presented within a context that gives it meaning and relevance, and which leads to increase in understanding and decrease in uncertainty. The value of information lies in its ability to affect a behaviour, decision, or outcome. (Business Dictionary, 2009)

¹⁶ "Projects as 'closed systems' are projects where outcomes are expected to be both controllable and in accordance with pre-determined plans, schedules and programmes. Projects as 'open systems' are those that see the project and its interaction with 'context' as exploratory, almost organic, and which allows for unexpected outcomes to become recognized and accepted as part of an 'emergent order'" (Dimitriou *et al.* 2008).

treated as 'open systems' which see the project and its interaction with 'context' (in its broadest sense) as exploratory, almost organic, and where unexpected outcomes become recognised and accepted as part of an 'emergent order'.

MUTPs are demonstrably not 'closed systems' or a system of commoditised services (though they may encompass elements of commodity service provision). Rather, they are 'open systems' treated on specific occasions (for practical purposes alone) as 'closed systems' that themselves change contexts and are themselves changed by context. They often have public service objectives and are employed (implicitly or explicitly) as a means to effect strategic change in city and regional systems (through for example, regeneration and economic restructuring efforts and/or providing strategic services) even though they may utilise aspects of the market in the financing and funding of their associated public services.

Sub-theme (ii): Model use and limitations - a model can be seized upon by decisionmakers hungry for certainty, but there are inherent dangers for those who do not appreciate their limitations. They are always a gross simplification of a complex reality. It places the excessive confidence often put in modelling in a much more realistic perspective rather than casts doubt on the integrity of the modelers. For MUTPs, it also begs the question of how much reliance decision-makers actually put on modelling as opposed to broad-based judgement in consideration of impacts and outcomes.

While models and other analytical tools (including 'case histories') that are firmly based on 'closed system' thinking do pose major limitations, they do have an important role to play in attempting to sense-make a MUTP during its different lifecycle phases. This is on the *proviso* that detailed attention is paid to the impact on context of such closed systems analysis, and the way in which context impacts on the project. Such tools, however, are generally fundamentally flawed by virtue of their in-built inability to cope with open systems and the evolutionary fluidity that ultimately accompanies their development over time. Many MUTP sponsors and stakeholders (including politicians and business leaders) are acutely aware of this with the result that model MUTP outputs are used or discarded depending upon whether they support or negate previously held views and/or 'gut feelings' of these parties – which frequently places the techno-rationalist professional at odds with those pursuing other (political and business) agendas.

Evidence-based MUTP tools and techniques are potentially problematic *if* the characteristics and features of the contexts in which they were conceived/ previously used are not fully identified and understood. This is so since these tools and techniques *may* sustain, even reinforce, undesirable path-dependent practices that are contrary to sustainable development visions and ultimately have the effect of the 'templating' of unsuitable solutions based on previous experiences perceived as successful from a singular past point of view in one point of time/place that are inappropriate to the new context.

Many note that hindsight and 'best practice' is likely to be only appropriate in the context of 'ordered, stable closed systems' and most applicable during project construction. This is so since constant changes in context make it especially difficult to effectively use prescriptive tools, models and techniques that are based on the notion of a 'closed system' equilibrium when the 'equilibrium' is in fact not known. This is because by nature such systems are largely insensitive to such change. Instead, they essentially present a snapshot or range of snapshots of outcomes based on the perceived value of identified variables that reflect current and future contexts in one point in time.

Systems should be put in place to guard against misrepresentations derived from unchallenged path-dependent MUTP analytical and forecasting practices. MUTP planning, appraisal and delivery tools and techniques should instead be part of a balanced decision making process and framework that prevent these tools and techniques being used

to solely support project sponsor vested interests or 'gut feelings' derived from past practices in different contexts.

4.8 Theme 7: The need for appropriate governance and regulatory frameworks¹⁷

Sub-theme (i): governance, regulation and RUC - international bodies such as the EU increasingly provide standards to assess and reduce risks during the implementation of cross-border projects and projects that fall within their international jurisdiction. National bodies are typically responsible for implementing systems to meet these international standards at the local level as well as those deemed necessary for national and local requirements. Such regulations can both reduce and increase project uncertainties, risks and complexities plus the sensitivity of the project to changing policy and planning contexts.

The development of one or more national agencies to provide guidance and quality control over MUTP planning, appraisal and delivery - as part of the process to consider and balance differing views or competing interests of the various stakeholders - are far and few between. This is, perhaps, with the exception of agencies such as the National Audit Office in UK which have more of an accountancy scope of concern that is typically too narrow to be able to offer a balanced overview of what is/ is not a successful MUTP. The relative infrequency of planning, appraising and implementing Mega Projects within any one country is a contributing factor to the lack of such agencies.

Even when international agencies exist with regulatory frameworks and accompanying codes of practice, their frequent limited or non-enforcement, combined with inadequate inspection procedures, are potentially very problematic. It is common for environmental risks caused by MUTPs to trigger pressure from concerned stakeholder groups that lead to the call and introduction of further legislation and regulations. For this to be meaningful, however, regulations *must* be backed up with competent enforcement bodies with sufficient powers.

In the spirit of globalization, governments and international agencies - with the support of regulators and anti-trust lawyers etc. - seek to increase competition and competitive practices as a means of directly or indirectly further reducing barriers to competition. This *can* throw MUTP stakeholder companies into the ever-more heated pursuit of a 'best practice' that is *not* always to the benefit of customers and the local communities which such projects traverse and impact and even, sometimes, to the detriment of project users, employees and even shareholders.

Constraints on what commences initially as an 'ordered' MUTP system can easily produce conditions under which that system shifts to being more complex and increasingly dysfunctional, to a point where it even collapses into a chaotic state. Translating this into the regulative frameworks for MUTP planning, delivery and operations -

¹⁷ Governance can be defined as the exercise of political authority and the use of institutional resources to manage society's problems and affairs;' (Williamson, 1991).

A framework is defined as the basic, underlying structure to a set of regulations. A framework is composed of a several complementary elements or concepts in support of something larger. Regulations are most often defined as principles, rules, or laws designed to control or govern behaviour. From a broad perspective, regulations are the instruments used to express government policy as a way to rectify market, economic or social imbalances. Therefore, in this context, a regulatory framework can be defined as the macro-level steps that a regulator must complete in order to bring forward regulations (Rabeau, 1998).

where public bodies seek to exert excessive control through bureaucracy – this may result in a slow build up of tension through frustration between MUTP provider and enforcer that ultimately leads to a collapse of the system. The risks, uncertainties and complexities for MUTP decision making stemming from insufficient political will, governance and regulation must therefore be identified and monitored throughout the project for their effectiveness.

4.9 Theme 8: The importance of context¹⁸

Sub-theme (i): why context matters - the context of any individual decision is unique, if only because of its temporal context, despite common threads and similarities (particularly in standardised decision-making processes, packages and models). Context is, in other words, *never* repeated in time, even though decisions may take place on a regular basis in the same place and institution.

'Context' encompasses a very large variety of dimensions for decision-making - including culture and societal beliefs/ values, time and space, economic circumstances, institutional frameworks and networks and, not least because of its impact on MUTP decision-making, political influence. All these aspects reflect different sources and degrees of RUC, and conspire to mould the way in which MUTPs are initially planned, implemented and ultimately brought into use.

An awareness of 'context' is a key factor in successful decision-making that addresses risk, uncertainty and complexity (RUC) (either explicitly or implicitly) within and outside the MUTP/planning field. This is to be expected since all decisions that are made are based on an individual's or group's perceptions of context and the levels of RUC prevailing (or anticipated) in that context at the time of making such decisions.

MUTP stakeholders must identify and appreciate the critical contexts (and there interdependencies) that surround pivotal project decision making. These critical contexts form the backbone of project planning and appraisal that ultimately mould the outcome of the project. During all phases of the MUTP, including the scoping process, a system should be put in place to regularly monitor the characteristics of each context. These are to be made both transparent and accessible to all project decision makers and others wishing to learn lessons from these experiences.

Interconnectedness between different elements of context leads to RUC that are particularly difficult to identify or analyse successfully.

Sub-theme (ii): The fluid and evolutionary nature of context and its impact on MUTP planning, appraisal and delivery - changes in context make it especially difficult to use (effectively) prescriptive tools, models and techniques that are based on the notion of a 'closed system' equilibrium as they are, by nature, largely insensitive to such change. They instead essentially present a snapshot or range of snapshots of outcomes based on the perceived value of identified variables that reflect current and future contexts.

In the context of MUTPs, this tells us that history is *not* necessarily an appropriate guide, indeed it may be positively misleading "as contexts continuously change and outcomes of decisions emerge over time and cannot be unambiguously determined" (OMEGA 1).

¹⁸ "Context is the set of circumstances or facts that surround a particular event or situation." (Random House Dictionary, 2009). For the purposes of examining MUTP decision making under RUC we can subdivide MUTP contexts into those which are external (exogenous) and those which are internal (endogenous) to the project.

Sub-theme (iii): 21stC pace of change as a key contextual influence - MUTP planners and delivery agents need to be fully aware that 'change' is gathering increasing pace in **21st Century** due, among other things, to rapid technological improvements and forces of globalisation. These are highly important contextual factors that affect the development of risk, uncertainty and the complexity of interactions.

Sub-theme (iv): context monitoring and the project lifecycle - regular and sustained monitoring throughout the MUTP project lifecycle of all contextual influences is clearly of utmost importance. This is especially so if MUTP planning and delivery is to be effective in responding to changing circumstances. Particular importance needs to be paid to contextual change resulting from a sense-making of the interplay of ideas, beliefs and values associated with different stakeholder groups and individuals.

Constant monitoring of context (in its widest sense) is critically important before and after decisions have been taken. There is little point, however, in monitoring context if you do not have the means to respond to identifiable changes and/or are not prepared to alter strategy and operations.

Sub-theme (v): institutional capacity as a key contextual influence - the institutional arrangements for MUTP planning, construction and operation are often fragmented and frequently continuously in flux leading to the absence of a sustainable framework with which to see such projects through from their planning to implementation and monitoring.

Sub-theme (vi): political influence as a key contextual driver - political intervention represents a key contextual influence on MUTP planning, appraisal and delivery.

Sub-theme (vii): mega events as critical contextual influences – mega events can have a particularly influential impact on MUTP planning, appraisal and delivery but such impacts may be both positive (resource availability and programme certainty) and negative (resource diversion from other projects and potentially undue haste).

Sub-theme (viii): serendipity¹⁹ and 'happenstance' - unlike others, this sub-theme is taken from UK case study findings which suggest that 'serendipity and happenstance' often play an important role in MUTP planning and delivery such that there occur particularly important moments in time when the prevailing context is ripe for decisive action to be taken.

Sub-theme (ix): longevity of the project lifecycle and relationship with context - there is the very real issue of the risk associated with projects that take a long time to deliver being especially vulnerable to changes in context - notably changes in market conditions overall, and changes in the demand for different types of accommodation.

4.10 Theme 9: Perception, assessment and treatment of risk, uncertainty and complexity

Sub-theme (i): generic risk sources - **MUTP lifecycles are typically fraught with concerns about risk, uncertainty and complexity** associated with (inter alia) their: size; cost; long gestation and implementation periods; impacts, and; uniqueness.

¹⁹ Serendipity - the occurrence and development of events by chance in a happy or beneficial way (<u>http://oxforddictionaries.com/definition/serendipity</u>)

Sub-theme (ii): the perception, nature and assessment of RUC - stakeholders often perceive RUC in a highly individual way.

Two important points are of direct relevance to MUTP planning: (1) the acknowledgement of the importance of 'framing and resolving a wider policy question is *not* just a technical task, but a social and political process' and (2) the acknowledgement that 'effective communication along the way can often be just as important as the identification and characterisation of risks and their uncertainties.

While risk assessment is seen as a mature methodology in the insurance and banking sectors, we conclude that such assessments and their subsequent use in MUTP planning and delivery needs to be:

- as all-embracing and contextually sensitive as possible, able to anticipate contextual change wherever possible;
- based on the concept of risk hierarchies;
- accompanied by constant monitoring and iteration; and
- undertaken collectively so as to expose all stakeholders to the inputs and assumptions used.

Sub-theme (iii): responses to RUC - subjective assessment based on experience and common sense is acknowledged as an appropriate and effective response to RUC in decision-making.

There are five principal strategies for managing risk. These include the strategies for risk: avoidance, reduction, sharing, transfer, retention, and hybrids of these.

Risk may be shared through consensus building between stakeholders.

Certain stakeholders have extensive faith in the ability to manage risk.

Sub-theme (iv): risk monitoring - monitoring risk is a critical component of MUTP planning, appraisal and delivery.

Sub-theme (v): innovation & *risk* - **innovation may involve radical or incremental changes in thinking, processes and services.** The goal of innovation is positive change, i.e., to make someone or something better.

Despite the fact that many MUTPs are promoted with visions of a more high-tech future, their financing rationale often favours tried-out technology rather than new innovations principally because new technologies are perceived to add more risk. There appears to be a preference for MUTPS to get the project up and started with already tested-technology and then retrofit as technology allows/requires, rather than offer a new high-tech major new project. In this way, the use of tried and tested technology is employed as an explicit means to mitigate risk.

Innovation is critically important to the 'success' of any MUTP. Such projects may indeed themselves be seen as large-scale technical social innovation systems. The adoption of decision-making based entirely on path dependent processes can stifle innovation to the detriment of the organisations involved in the planning, appraisal and delivery of MUTPs *and* their stakeholders. Parties employing such practices typically become less responsive and adaptable to new risks with the result that innovation requires some excess capacity within their institutional responsibilities for their planning, appraisal

and delivery. Such resources are though not always available, especially in companies that are competing in the open market to the bottom line.

Innovation is an important determinant of the 'success' of MUTPs, especially through the introduction of innovative technology as a potential remedy for delays which are caused by complexity and uncertainty during a military operation even though such actions are not always decisive. In practice, MUTP stakeholders are typically risk averse and usually only employ well tested technology. This can lead to stifled innovation in many/most MUTPs.

The techniques for quantifying risks when an innovative entity is introduced into MUTP planning, appraisal and delivery - and the consequences of this introduction - can yield uncertain and even potentially highly damaging outcomes. This accounts for the more measured view of innovation prevailing in MUTP developments and the importance of striking a balance between innovation and risk-taking in decision-making and technology choice. A particularly important determinant of the effective use of new technology to a MUTP is the context in which the innovation was *first* developed, and the possible effects of introducing the innovation into a *new* context. A critical question that needs to be asked in such circumstances is whether the risks of the new technology are outweighed by its potential benefits or do they merely add *unbearably* to an already high risk venture?

One of the *almost* inevitable consequences of innovation and change in decision making regarding MUTP developments is to bring about conflicts. This accounts for much of the resistance to innovation in MUTP developments – especially among the more conservative organisations/agencies involved. Few such parties embrace change as a learning experience; a feature which improves innovation capabilities. Technological innovations and the interaction of such forces with the contexts of MUTPs can, furthermore, produce unknown/unintended complex reactive forces/impacts liable to generate even more contextual change. This can be particularity important for MUTPs where practitioners apply their own tried-and-tested technology to the project, and where decision making can develop into a series of contradicting analyses and insights that ultimately can destabilise the project if not addressed.

Sub-theme (vi): drivers of uncertainty - in the context of MUTPs, the first requirement to comprehend here is that 'uncertainty' exists, and to communicate that to the stakeholders. To a technocrat owning up to uncertainty can sometimes be seen as tantamount to an admission of failure. 'Certainty' has its place in a closed deterministic system, *but* it is wholly inappropriate in anticipating outcomes in an open behavioral system. Nevertheless, to understand *and* to communicate the drivers of uncertainty and their effects is most important for MUTPs in devising strategies that are both robust and resilient in identifiable dimensions.

Sub-theme (vii): complexity drives uncertainty - the properties of complex systems include: emergent' rather than directed outcomes and relationships that contain: feedback loops, 'open' systems, retrospective coherence, an acknowledgement that the whole is more than the sum of the parts and holonic (hierarchical) characteristics. We also noted a difficulty to determine boundaries, relationships that are non-linear, a frequent inability to predict due to the absence of knowledge of probable behaviour over the long term, relationships that are non-linear with transitions occurring abruptly when thresholds are breached (*tipping points*).

Sub-theme (viii): the ability to 'control' project planning, appraisal and delivery - the accepted premise is that some planned operations "can never be perfectly controlled because many of the decisions made are frequently based on partial information or are made under such stressful circumstances that they can impair clear decision-making and

conspire to reduce the efficiency of the armed forces by continuously bringing them into contact with the influence of chance" is directly relevant to MUTP planning.

4.11 Theme 10: The role of sustainable development visions and challenges in MUTP planning, appraisal and delivery

Sub-theme (i): can SDVs currently provide appropriate frameworks for MUTP planning, appraisal and delivery? - the report that "a lack of shared vision of what 'sustainable development' means (for a particular region or city) threatens to undermine the potential to deliver sustainable development" in the UK (2004) raises a number of challenges for MUTPs, including: whether they (the MUTPs) effectively: (1) meet the needs of intra-generational equity; (2) are adequately geared to address globalisation issues; (3) promote and advance the principle of socio-economic equity; and (4) contribute to environmental and inter-species equity.

4.12 **Theme 11: The need for lesson** learning/sharing²⁰

Sub-theme (i): the need for project-based lesson learning and sharing - project learning *must* be an integral part of MUTP decision making, and to this end, systems need to be put in place for distributing both positive and negative lessons learnt by all stakeholders during each phase of the project. These systems need, furthermore, to facilitate the sharing of these lessons with the wider community impacted by the project during the evaluation stage.

Systems need to be in place to enable thorough post-project institutional learning of MUTP experiences and impacts. This is not currently undertaken in the UK and elsewhere in any systematic manner to enable MUTP outcomes and the associated occurrence of risk, uncertainty and complexity factors to be evaluated in project decision making. This shared lesson learning and review would prove particularly valuable in efforts to identify MUTP impacts that were not discernable previously.

The importance of case history and the existence of a body of 'good (not 'best') practice' is essential to project lesson learning and sharing, especially with regard to the identification and handling of risk, uncertainty and context (and the impact of 'context' on these) in policy, business and professional fields associated with MUTP planning, appraisal and delivery. This practice may be found in other fields, disciplines and professions such as in the military, in earthquake engineering, in civil engineering, as well as in insurance and banking. The absence of an equivalent body of systematically appraised and reviewed project experiences does not exist for MUTPs. This confirms the above made observation that little evidence of systematic institutional learning and knowledge-sharing from past projects is taking place that go beyond: (1) the informal personal and company exchanges of experiences and (2) the employment of common international handbooks and standards which, among other things, have the effect of standardising MUTP solutions.

4.13 Theme 12: Enhancing skills and competencies

Sub-theme (i): the need for enhanced skills and competencies in MUTP planning, appraisal and delivery - this theme is drawn from insights delivered by stakeholders in the course of conducting the UK case studies rather than explicitly from the OMEGA 1 Project (although this theme is implicit in many of the insights identified by OMEGA 1).

²⁰ Lesson can be defined as an occurrence from which instruction may be gained; an instructive example; (OED, 2009)

5. Responses to OMEGA overall research questions and hypotheses

5.1 Introduction

A key component of the OMEGA research programme is to prepare an analysis of responses to the programme's Overall Research Questions (ORQs) and Overall Research Hypotheses (ORHs). This sensemaking of patterns of responses is based primarily on information obtained from case study and country synthesis analyses provided in Volume 3 (UK OMEGA case studies) and Volume 4 (International OMEGA case studies). To reiterate, the ORQs and ORHs are as follows:

- **ORQ#1:** What constitutes a 'successful mega urban transport project in the 21st century?
- **ORQ#2:** How well has risk, uncertainty and complexity been treated in the planning, appraisal and delivery of such projects?
- **ORQ#3:** How important is context in making judgements regarding Overall Research Questions 1 and 2?
- **ORH#1:** Traditional criteria relating to cost overruns, completion dates, generation of travel time savings for users and rates of returns to investors are inadequate measures of success in the 21st Century as sustainable development concerns become increasingly critical both globally and locally.
- **ORH#2**: The new emerging international and local agenda related to vision(s) of sustainable development is multi-dimensional and goes beyond notions of environmental sustainability, as critical as this may be, in that it also concerns inter-related concepts of economic sustainability, social sustainability and institutional sustainability.
- **ORH#3:** The level of competence in decision-making and planning in today's fastchanging world is best assessed by the adequacy of the treatment of risk, uncertainty and complexity and sensitivity to context – all of which are important demands on Strategic Planning.

It is important to acknowledge here that a number of International Partner submissions did not unfortunately provide explicit responses to the ORQs and ORHs (although these were requested on a number of occasions). Because the OMEGA Centre Team is conscious that attempting to extract such responses from the rather dense accounts of '4 Test' findings and Country Summary Report findings runs the risk of misinterpretation and since to extract such interpretation requires the sort of specialist knowledge of context that the Centre Team simply does not possess, for the purposes of sensemaking, we have had to concentrate here on those Partner submissions that reflect *explicit* responses to the ORQs and ORHs. Notwithstanding this, Partner submissions to date provide some important, revealing and interesting insights into MUTP planning, appraisal and delivery relevant to these ORQs and ORHs which the Centre Team has sought to report as follows.

It is finally important to acknowledge that, such is the breadth and depth of information provided by OMEGA Partners concerning each case study and country context that the responses to ORQs and ORHs could take many and varied forms - i.e. the data could be 'cut' very many different ways. Here, we have made the conscious choice to try to provide a broad assessment of overall patterns of findings rather than seeking to drill down deeply into particular aspects of the research. This decision has been taken on the understanding that it is, at this juncture, of more value to provide an overview-type account of UK and international based OMEGA findings which is able to inform the development of lessons for decision-makers. That said, we acknowledge that the valuable reservoir of data gathered by the OMEGA International Partner Network could and should be made available for use by

other parties at a later date so as to facilitate the sort of drill-down analysis that has not been adopted for the purposes of the current research programme.

With this in mind, the approach adopted for this sensemaking of responses to the OMEGA ORQs and ORHs is essentially threefold. It offers:

- synthesised potentially generic responses to ORQs and ORHs that have been extracted from the UK case studies and Country Summary Report as the basis for a subsequent sensemaking analysis, primarily to determine the degree of resonance (if any) with responses provided by Partners;
- responses that have been 'clustered' around the main topics associated with the UK-based findings regarding the ORQs and ORHs provided by Partners, insofar as this is possible, in relation to perceived instances of resonance. For each topic a series of exemplars extracted from the international findings are provided; and
- emergent responses that represent a distinct or somewhat unusual cluster of findings derived from the ORQs and ORHs also extracted and supplemented by examples drawn from the international case study findings.

It should be noted that where examples are provided from amongst the international OMEGA case studies, these are *not* intended to be exhaustive or comprehensive - merely a means to highlight/illustrate key findings and the different contextual slants that might accompany each finding. In addition, it is acknowledged that we have concentrated on the use of potentially generic responses to the ORQs and ORHs drawn from UK case studies as a point of departure.

5.2 UK and International responses to ORQs and ORHs

ORQ#1 - What constitutes a 'successful mega urban transport project in the 21st century?

5.2.1 Relationship between project visions, goals and objectives and judgements about project 'success/failure'

5.2.1.1 Need for early determination of likely project complexity

Insights drawn from the UK OMEGA case study findings suggest that individual MUTPs are likely to be associated with different degrees of complexity. They also suggest that those projects that are likely to be simple/straightforward can be differentiated from those which are more complex and with potentially multiple interactions with the areas they serve/traverse for which 'agent of change' and agglomeration objectives are likely to be attached.

While it is self-evident that, based on the international OMEGA case studies undertaken, the degree of complexity associated with each MUTP is likely to vary considerably as a result of its intended or actual relationship with the areas and sectors it impacts upon, *no* explicit insights in this respect were put forward by Partners. This does not, in itself, mean that the UK findings do not resonate with those provided by Partners - rather, it is suggested that this matter was simply not considered.

5.2.1.2 Need for clear visions and objectives at the outset

On the basis of interviewee responses, UK findings suggest that MUTPs which are accompanied by clear visions and objectives are more likely to be *seen as* 'successful' by

stakeholders; however, in light of other interviewee observations regarding the necessarily evolutionary nature of objectives for projects which are deemed 'complex', it would seem likely that the existence and retention of clear and firmly established visions and objectives at the outset is more appropriate for relatively straightforward projects. The relationship between a MUTP's vision, scope, principle objectives and secondary objectives often needs clarification, together with an explanation of how these relate to prepared technical and management plans.

This matter was the subject of considerable discussion at the OMEGA Workshop in Perth (July 2011 – see Appendix 10). However, the OMEGA international case study findings were generally found to be supplementary to the above in that they added a number of important points of clarification rather than contradicted them. Chief among these findings were:

- MUTPs are likely to benefit from a clear and uncomplicated rationale accompanied by a strong and convincing narrative and/or a 'self-evident need.' Such narratives are *particularly* useful when based upon a previous 'success'. Conversely, international findings suggest that MUTPs which are afflicted by unclear visions and/or conflicting objectives are seen as much *less* likely to succeed. For example: in the case of Melbourne City Link there was a clear and uncomplicated rationale for the project which derived from prior motorway building that had left certain key freeways unconnected and channeling traffic through the city centre. In the case of the Athens Metro and Attiki Odos, congestion and car-generated pollution were seen as major threats to the quality of life in Athens; and in the case of the Perth Mandurah Railway, this project had the advantage of building on the prior success of the Northern Suburbs railway project.
- Project visions, goals and objectives based on a degree of consensus regarding the need for a project can often result in its' implementation being perceived as somewhat 'inevitable' In the case of Kyushu Shinkansen, it was widely recognised that the national railway network could assist in spreading the benefits of economic growth by decentralising population and industry. Similarly, for the Melbourne City Link, a large range of stakeholders across the community viewed the project as close to inevitable the primary rationale was a transport argument based on a history of existing policies favouring motorway building.
- Even where consensus exists, there may still be conflicts between MUTP objectives that are difficult to reconcile. For example, OMEGA Partner findings note that in the case of Sydney Cross City Tunnel it seems probable that at the heart of the project, the objective of raising revenue for the government (or at least costing nothing to the government) conflicted radically with the aim of ensuring maximum possible usage of the tunnel. In the case of the Oresund Link, findings from interviewees suggested that although the project has been a beneficial factor in the development of the regional train system, the building of a new motorway on the bridge, and more importantly, new motorways connecting to the bridge, has acted as a forceful agent for continued car use. In this way, The Oresund Link might be seen in hindsight as a MUTP that did *not* contribute as positively to goals of sustainable development as promoted.

5.2.1.3 How is 'success' perceived

The findings presented below arose principally from the international OMEGA case study findings based on interviewee responses but *do* resonate very strongly with those of the UK case studies. In particular, these findings resonate closely with one of the key 'clarification questions' that underpin the OMEGA research programme; namely, from which/whose perspective should 'success' be judged?

OMEGA findings indicate that *irrespective* of the output from 'official' appraisal processes of MUTPs, stakeholder perceptions of 'success' (and failure) are frequently: highly individual,

often subjective and express a very wide range of views. They were found in some cases to be based on entrenched ideological positions or on strong perceptions of the project's iconic value as an agent of modernisation – rather than reflecting actual outcomes/impacts. In some instances, judgements were based on a particular aspect of a project (e.g. the success associated with the planning and delivery process rather than the MUTP itself and vice versa). In other cases, they were premised on emotional responses to a project. What was particularly noted is that the values employed to make such judgements were often changeable over time – such that today's project 'failures' may become perceived as tomorrow's 'successes' (and vice versa).

It is interesting to note that even those MUTPs that seemingly met their core functional objectives may be viewed as 'failures' - especially when they become detached from their accompanying narrative – as was the case of the Sydney Cross City Tunnel (see below). Moreover, there are a number of examples where perceptions of success/failure continue to be divergent over substantial periods of time (e.g. where environmental groups originally opposed to a project continue to view it as a failure, whereas more supportive stakeholder groups perceive it as a success). Examples of these differing perceptions among numerous international OMEGA case studies are as follows:

Australia – both the Melbourne City Link and the Perth-Mandurah Railway projects achieved a token of success in the simple fact that they were implemented and put to use. That simple fact came to symbolize the success of the projects after they were completed. By contrast, the Sydney Cross City Tunnel was delivered on time and on budget; however these achievements did *not* save the tunnel from a widespread perception of 'failure'. This is so, it is suggested, because the project became detached from its original narrative, which was one of improving the deteriorated environment of the Sydney CBD.

Sweden – the Oresund Link, almost ten years after its completion, is generally regarded as a 'successful' MUTP and is greatly appreciated for its aesthetic value. This view was shared by most of the parties interviewed for this case study. This is so with the exception of a number environmental of organisations who opposed the project from the outset due to the effects it would have on increasing road transport use/dependence in the region. Opinions derived from the OMEGA interviewees regarding the successfulness of the Southern Link seem to be divided, ranging from outright praise for the project to very negative responses - to a degree that we conclude that this can *only* be explained by people focusing on different aspects of the project. The more positive opinions were especially focused on project implementation aspects, while negative attitudes mainly concerned observations about the function and effect of the Southern Link in a wider perspective. There is no consensus on the outcome of the Arlanda Rail Link and it seems that it has been judged *both* as a great success and as a failure by different observers - largely dependent (we suggest) on the ideological standpoint of the observer, especially in relation to attitudes towards private financing of public infrastructure.

Hong Kong – from an 'iron triangle' project management viewpoint, the Western Harbour Crossing project was a 'model design' and 'model construct project', and remains an example of successful project execution under very complex circumstances, (i.e. in the middle of one of the busiest harbours in the world). However, the subsequent Western Harbour Crossing operation has *not* been considered satisfactory by both investors and the public (despite offering a superb link to the airport and container port) due to its high prices/ low demand and low revenues;

5.2.1.4 Dissemination of project objectives

UK case OMEGA study findings indicate that a notable feature of 'successful' MUTPs is the full dissemination of project objectives (including those associated with project and agency

roles/functions and performance indicators) to all key stakeholders – both at project commencement and when any significant changes are made in response to changing contextual influences. This is seen to be most helpful in maintaining positive relations with key stakeholders and avoiding 'expectation creep'.

This finding was not seen as particularly significant in regard to the international OMEGA case studies – only one project (the Randstadrail) was cited in this connection where the lack of the dissemination of project objectives was seen to be the result of the MUTP being developed by the operators and local authorities which did *not* adequately communicate key objectives.

5.2.1.5 Project visions, goals and objectives and politics/political cycles

UK OMEGA case study interviewee findings indicate that:

- political influence is frequently seen as the *most* powerful force in regard to the MUTP planning and appraisal process, and;
- that such projects are frequently affected by the apparent tension between the initial and subsequent emerging 'vision(s)' of the project and political practices/pragmatism, often associated with short-term political cycles. This is frequently seen by many key stakeholders as the enemy of strategic thinking and strategic project formulation/implementation.

International OMEGA case study findings suggest strong resonance with the notion that political influence is often all-pervasive throughout all phases of the MUTP project cycle, but especially during the planning and appraisal phases. In particular, it was noted that:

- in *certain* contexts, political intervention arises for reasons of self-promotion of vested interests reflected in certain political quarters (as was noted by our Greek Partner in the case of the Greek OMEGA Case studies);
- MUTPs appear to benefit from both strong political leadership and wide ranging political support, especially as a means to create sufficient momentum for a project to proceed. This was seen as particularly pertinent in the case of the Melbourne City Link and Southern Link; and
- the nature of political influence can often change as a result of different positions being adopted by key players at different points in the project lifecycle – driven by competing political imperatives and agendas. As a result, political 'ownership' of a project is *not* always clear throughout the planning and delivery process, as was evident in the case of Sydney Cross City Tunnel for example.

It is also apparent that a distinction can be made between short-term political intervention(s) - based on external political drivers such as electioneering (generally perceived as a negative influence) and strong political leadership based on vision which creates/reinforces momentum in driving a project forward (generally perceived as a positive influence).

Broadly-based political support (following consensus on the rationale for a project) is also seen as a key factor in successful projects.

Further examples of the above derived from OMEGA interviewee responses included:

Hong Kong – political influence was seen to be a critical factor in the development of the case studies. For example, political tension in the period up to the hand-over to China delayed the Airport Railway by one year. What this and other experiences suggest is that political influence on MUTPs should be seen as more of an evolutionary process. However, while political will emerged as probably the most important factor in MUTP decision-making, there was also seen to be a continuum at work. While it was pointed out in the HK
interviewee responses that *all* MUTP decisions may ultimately be progressed by political will, this is seen to be important in different ways (and at different intensities) at different times in a project's lifecycle.

Sweden – many OMEGA respondents for the OMEGA case studies cited broad political support as important in order for a MUTP to be 'successful'. However, the responses suggested that the view of what broad political support 'means' can differ. To some it can mean that the main political parties (in both Sweden and Denmark) and major stakeholders *support* the project. To others, such support is *not* seen to be enough if the project is contested by other parties and stakeholders that are excluded from the formal decision-making process.

Australia – The politics in the case of the Perth-Mandurah Railway suggest that the distribution of transport opportunities was a significant factor from the start. Once the Northern suburbs rail line had been built, people started looking to the suburbs sprawling along the Perth coastline to the South of the CBD. At first this 'look' was no more than a rhetorical sop to that particular public. Then it was perceived, by the government and Perth City, that the people of the South West were significant to the economy of the whole city.

5.2.1.6 MUTPs as 'agents of change'

In summary, one may conclude that UK case study findings suggest that: the relationship between MUTPs and wider spatial/sectoral initiatives are often *not* fully exploited in terms of coherent land use-transport strategies (and in terms of any retrofitting initiatives that may follow); the full benefits (and outcomes) of MUTPs that are either positively positioned as agents of change or become de facto agents of change (due to their multiple influences on the areas/sectors that they impact upon), may well only materialise in the longer term and are thus frequently under-appreciated (especially in terms of appraisal methodologies), and; MUTP planning and delivery agents often do not demonstrate clarity of thinking about the nature and impact of forces of change.

International case study findings generally echo the above UK observations and, in particular, suggest that the multi-dimensional relationships between MUTPs and the areas they serve/traverse are often not adequately appreciated, understood or accommodated in the accompanying spatial and sectoral plans and programmes. This is illustrated by Figure 5.1, from a sensemaking analysis²¹ of the pre-hypothesis data, which shows a significant relationship between project uncertainty circumstances and the scale of project impact. It is furthermore observed that in many instances MUTPs precede or are drivers of 'parent' spatial and sectoral plans, reinforcing the notion that MUTP agent of change roles are often not fully anticipated at the outset. This is due, it is suspected, to the rather 'narrow' framing of projects as (predominantly) projects that service market needs or that are dependent upon market forces for their success (like commodities) rather than being seen in wider development and welfare terms. Some case study reports cite 'missed opportunities' and/or a lack of co-ordination with spatial plans and programmes as a significant development. These findings also suggest that synergies between MUTPs and wider urban development plans/programmes are seen to not only increase the societal value of individual projects but also make their appraisal significantly more uncertain and complex. Hence, as in the UK case studies, OMEGA Partner findings indicate that MUTPs with intended agent of change roles and functions are considered to be difficult to appraise using traditional criteria and thus *ultimately* require a broader multi-dimensional appraisal framework.

²¹ Results shown in this section of the report are from a sensemaking analysis of 1787 stories from the 21 projects where prehypothesis indexed data was supplied. The sample data consists of 1240 Sense Making Items (SMIs) attributed to 'complex projects', and 547 SMIs attributed to 'simple projects'

Figure 5.1: A plot of prehypothesis nsarratives where a significant relationship was found between 'scale of project impacts' and 'project uncertainty' for simple²² OMEGA MUTPs



Axis for Uncertainty Circumstances 0 = Totally certain 100 = Completely uncertain

Further examples of the above are as follows:

Hong Kong – In the case of the West Rail Project (Phase I), it is *not* clear how the Territory's Railway Development Strategy is related to land use and environmental planning or the city's long-term socio-economic development strategies. It is difficult to judge whether the case study's stated aims reflected the prevailing social values at that time of the project's planning and whether they are now capable of being integrated with the urban fabric and address climate change and environmental issues according to current standards and norms. The Western Harbour Crossing project was conceived as a stand-alone facility within the context of a larger strategic development (the Hong Kong airport) but represented a major lost opportunity in that its objectives did *not* specifically include the opening up of new areas for development, thus increasing its attractiveness.

Netherlands – In the case of the HSL-Zuid project, OMEGA Partners deduced from their interviewee responses that this project was narrowly framed as a transport infrastructure project and thus other considerations (such as how it could stimulate or connect with urban growth) were not considered/neglected. Similarly, the Randstadrail project was limited in incorporating other types of spatial and sectoral planning strategies. On this basis, the OMEGA Partners suggested that this project would have benefited from complementary policies and programmes to support its unspecified agent of change functions.

Greece – MUTPs in Greece have been designed and implemented as being almost detached from spatial planning. On the basis of interviewee responses collected by our Greek Partners it was noted that the integration of their MUTPs into a wider urban development plan offered the potential to increase the societal value of such projects, *but*

²² comprise those that are delivered to meet primarily short and medium-term functional objectives, often as a response to an existing, self-evident problem or need

their outcomes become more uncertain and complex as it is realised that the plans and projects will require the resolution of many conflicting interests.

France – Interviewee responses from the French OMEGA case studies led the team to recognise the importance of the multi-dimensional nature of relationships between MUTPs and the areas they serve/traverse. They conclude that none of the case study projects they reviewed could ignore the issue of their relationship with the territories that they either served or impacted upon. In this connection it is important to recognize that these territorial issues relate to a series of different dimensions, including: socio-political dimensions (in particular, opposition to the projects); economic dimensions, especially regarding the challenges associated with the impact of the MUTP on the local economy (and whether it contributes to its development or constitutes a threat); environmental dimensions, here increasing concerns about the respect for nature and environment protection have been frequently expressed; institutional dimensions, especially the involvement of many different institutions, the frequent non-systematic approaches adopted to the treatment of the areas influenced by each MUTP and the lack of co-ordination between the multiplicity of these institutions (here the different 'scales' at which each local authority operates becomes significant).

Japan – In relation to the Kyushu Shinkansen project, Partner reports of interviewee responses suggest that when the Japanese fast-train network was first planned in 1973, economic sustainability from the regional point of view and social sustainability from the national point of view were not mutually exclusive. However, as the implementation of the project moved from the section with high benefits near Tokyo and Osaka to the more remote sections with low benefits (such as Kyushu Region), public perceptions became more negative. It was speculated by the OMEGA Japanese Partner Team that the privatization of the Japanese National Railways (JNR) and financial aspects of national government might also have shifted public priorities at the time from social to economic sustainability, conflicting with people in the Region who have waited for the project for a long time. We believe this type of conflict can occur when there are divergent views as to a MUTP's key objectives between national and local stakeholders.

5.2.1.7 'Emergent' objectives

UK case study findings derived from OMEGA interviewees indicate that, for many MUTPs, there exists the likelihood that new project objectives will emerge over the course of the planning and appraisal periods as a result of changing contextual elements (including emerging/changing stakeholder agendas). As earlier mentioned, this is seen to be most relevant for those projects that are characterised by potentially multiple interactions with the area(s) they traverse/serve and which are accompanied by 'agent of change' objectives.

International Partner OMEGA case study findings concur with the above observation in that many of the MUTPs reviewed were indeed impacted by 'emergent' objectives. OMEGA International Partner findings also suggest that project stakeholders perceive it as somewhat 'inevitable' that most MUTPs will be subject to (often fundamental) change during the course of their planning and delivery as a result, for example, of pivotal contextual changes. The OMEGA French Team's Country Summary Report notes that of the three case studies, only the Millau Viaduct (a relative straightforward MUTP not withstanding its remarkable engineering feats) remained substantially unchanged (although even here several amendments were made). For the other OMEGA French case studies (Paris Meteor and TGV-Med MUTPs), the projects that were finally delivered were significantly different from those which were originally conceived.

5.2.2 Appropriate bases for assessing 'success'?

5.2.2.1 Need for an appropriate contextual frame for judging 'success'

The UK OMEGA case study findings indicate that sound judgements about a project's success/failure are based on a clear sense of the overriding context that prevailed at the time the project was launched, since this will have inevitably impacted on the fundamental raison d'etre of the project, and any revisions made to project objectives during the planning, appraisal and delivery period. These revisions were often reflected subsequent 'bolt-on' needs/aspirations associated with such matters as territorial restructuring and urban regeneration (frequently spawned from or a reflection of political imperatives or visions).

The above findings - derived from a review UK interviewee responses - are supported by those emanating from the OMEGA international case studies which suggest that establishing an appropriate contextual frame enables judgements of 'success' to account for prevailing conditions when a project is conceived, appraised and implemented. For example, major road projects may be perceived as successful in their own right but *not* in terms of their contribution to wider transport policy aims, such as the enhancement of public transport viability. Prevailing context(s) also influences the efficacy of success criteria such as cost forecasts. For example, as noted above, many MUTPs (almost by definition) evolve over time making the application of 'original' cost criteria inappropriate – although this is seemingly not always recognised.

The institutional framework for MUTPs (i.e. the way in which powers, responsibilities and duties are distributed between different public and/or private sector organisations associated with the planning, appraisal and delivery) is also seen as an important element of the prevailing context, with several references being made by OMEGA Partner Teams to institutional fragmentation and public-private sector relationships affecting project success. Moreover, the prevailing external economic context can also influence perceptions of project success, when, for example, economic crises encourage the emergence of new project objectives such as support for 'growth/stimulus strategies' or the use of PPP/PFIs.

In light of the above OMEGA case study findings, it may be concluded that many MUTP stakeholders recognise the need for more broadly-based appraisal frameworks which are better capable of reflecting:

- the broader roles/functions that MUTPs are often expected to fulfil;
- the likelihood that project objectives and associated design/specifications will change over time; and
- the critical contexts with which the project, and its planning and delivery processes, have to deal.

Illustrations of the above findings among the OMEGA case studies are as follows:

Australia – If viewed in a limited contextual frame, Melbourne City Link was a success. If, however, viewed in a broader transport context its success is more questionable. Almost certainly the motorway building program has led to increased traffic. From a wider transport perspective, the opportunity cost of building top quality motorways is, at least in part, the impoverishment of the public transport system, which was exacerbated by its deliberate fragmentation by government concomitant on privatisation. It is also noted that the nature of the institutional framework (i.e., the fragmentation of its make-up and the subsequent institutional gaps that emerged) needs to be taken into account in determining the 'success' or otherwise of the project. In the case of the Sydney MUTP case study, the Australian OMEGA Team report that there are a large number of agencies involved in the decision-making process and they are poorly coordinated. In contrast with the Melbourne City Link

Project, the Sydney project was given to an already existing agency, which then had to try to coordinate with the Department of Planning and other agencies to get approval.

France – According to the interviewee responses for the French OMEGA case studies, in many cases, the comparison of actual outcomes with forecasts is rendered inaccurate by the fact that often it is *not* the same project that is being evaluated (on account of the fact that MUTP evolved greatly over time). On this basis, the French OMEGA Team conclude that the context in which an MUTP operates is very different in one period of time as compared to another, and that different methods/assumptions need to be used to evaluate outcomes that relate to these different circumstances.

Greece – Greek Partners note that the road to the realization of the three projects has been described as so hard and treacherous that achieving their construction and operation is regarded as a success by itself. This is considered to be specific to context since the three projects constituted the first generation of MUTPs to be implemented in Greece (in the last 30 years) in an institutional and economic context that exposed the projects to serious hurdles and risks.

Netherlands – it is noted that, for HSL-Zuid, three of the four main objectives related to economic development, however, their achievement is hard to measure, due to the time required for outcomes to become apparent. Whether the project will add a direct financial injection to the economy remains to be seen. The economic benefits of projects are always brought forward, but are rarely properly measured - they may be taken into account, or estimated, in cost benefit analysis but little attention is given to the ex-post impact of these projects.

Japan – as with the Sydney Cross City Tunnel, the Japan Team noted that one of the blocking mechanisms for the Metropolitan Expressway was the relationship between institutions with different responsibilities. In this case, when the 1990 City Planning Decision introduced the change from an elevated to underground structure, the national government was not supportive because it might set a precedent for other projects.

Sweden – Arlanda Rail Link was the first example of a public-private partnership for a transport infrastructure project in Sweden. This has conditioned the view of its success both by proponents and critics.

In addition to the above, a number of Partners noted the need to take due account of the economic context that prevails when a project is planned, appraised and delivered. For example, in regard to the Melbourne City Link, the rationale for the project was heightened in the early 1990s by the recession of that time, and the need to 'get Victoria moving again' (the project became the signature project of the Kennett government to get investment flowing again in Victoria, which had come to be regarded as a 'rust-bucket State'). The Hong Kong Team note that the Western Harbour Crossing opened at the worst possible time, at the onset of the Asian financial crisis in mid-1997. This affected demand, and also caused public projects to be postponed, such as the Central-Wanchai Bypass that would have made WHC more attractive to users.

5.2.2.2 Functional/internal objectives v broader agglomeration objectives

UK case study findings indicate that:

- the extent to which functional/internal objectives relating to (especially) time and budget have been met is regarded by many as the fundamental basis for judging project success/failure;
- agglomeration objectives such as those relating to regeneration and economic growth are seen as important but are perceived as being very difficult (if not impossible) to measure successfully, especially in where there exist only rather immature appraisal and

evaluation methodologies for judging success in this respect. This is perhaps understandable given that such agglomeration impacts/benefits are not only difficult to discern and appraise/evaluate with accuracy but may only arise well after the project has been completed;

- MUTP objectives frequently reflect differing levels and types of hope and expectation, associated with both the basic raison d'etre of a project and its potential to offer wider benefits. In this sense objective setting often fails to distinguish whether a particular MUTP is expected to deliver a service or a commodity (or both). Hence, some objectives reflect the fundamental reason why a project is being pursued (e.g. to address an existing self-evident problem) and represent the 'bottom-line' of outcomes that must be achieved, while others are more aspirational in nature and reflect less certain, but equally desirable outcomes in terms of (for example) agent of change functions;
- it would seem that the benefits/costs and impacts associated with MUTPs are often: (a) very difficult to discern at the outset; (b) only realised in the long-term, and; (c) somewhat unexpected;
- project objectives are more likely to be useful in the context of appraisal if they are capable of being operationalised in such a way as to be meaningful to all stakeholders.

There is broad consensus amongst Partner findings regarding the above in that many stakeholders still perceive the need to achieve a project's functional/internal objectives related to time/cost/specification as remaining of critical importance in most international contexts. This is seen as particularly pertinent for PPP/PFI projects (including the long-term effects of financing mechanisms). However, stakeholders also recognise the apparent tension between 'traditional' (iron triangle) criteria and broader agglomeration objectives in suggesting the need for establishing an appraisal framework that is better equipped to deal with critical performance characteristics that are *not* associated with time, cost and specification and reflect wider and longer-term impacts - such as the effect on travel patterns, modal share and employment markets.

The following illustrate the view that the need to achieve a project's internal objectives and those associated with time/cost/specification remains critical:

Australia – interviewees noted that success is judged by the capacity of a MUTP to meet its internal goals: "One that delivers the outcomes upon which the project was based" and "The successful delivery of a series of articulated, clear, sensible objectives. What constitutes success is being clear about what we're trying to make happen."

Greece – the Greek Team concur that traditional measures of success (cost overruns, completion dates, and generation of travel time savings for users and rates of return to investors) are still considered by a majority of respondents as major criteria of success.

USA – the USA Team conclude that by conventional criteria two of the three case study projects can be judged successful. The JFK AirTrain and the Alameda Corridor were completed close to their initial schedules and near their initially approved budgets, and they achieved the traffic volumes and user fee revenues initially anticipated in approximately the planned time frame. By contrast, the Big Dig failed to meet certain basic criteria. It was completed more than seven years behind the initial schedule at a cost far in excess of initial budgets. Its original design required substantial changes during the course of the project because of key stakeholder objections, and commitments made by the project sponsors for environmental mitigation due to expanded auto traffic volume have not all been implemented. In addition, the quality of construction work has proved low, leading to leaks, tunnel roof collapses and associated fatalities after the project was completed.

In addition, the following findings highlight the tensions between *'traditional' criteria* and *broader agglomeration objectives:*

Hong Kong – the Hong Kong Team conclude that facilities such as the Airport Railway need to be considered as part of the airport as a whole rather than as a stand-alone transportation project. The benefits of the development of Airport railway are seriously understated when its performance is evaluated solely on financial criteria, and as a closed system. In particular, the urban development benefits that have occurred around its dense, master-planned, mixed use, multi-modal station nodes are extensive. Thus, it can be seen that projects can only be considered to be 'successful' when measured against multiple criteria, including (for example) economic impacts, social impacts, and impacts on the environment. Moreover, there is much debate to be had about deciding on the weights allocated to these various criteria.

Sweden – The Sweden Team note that, based on interviewee responses, it is not appropriate to judge the success of a project based on economic and technical criteria only (e.g. economic performance, keeping to budget, traffic volumes, meeting environmental requirements). In order to get a full picture of success it is essential also to consider the wider and longer-term effects of mega projects. In particular, it is explained that:

- the Southern Link (together with other road projects in Stockholm) will probably have wider effects in the form of an increase in car travel and a lock-in into further dependence on car use;
- Arlanda Rail Link has the potential to change travel habits to and from the airport, but this is currently not materialising because of high ticket prices on the air shuttle;
- The Oresund Link, while some of the economic indicators for the project were not met, the main success factor is that it has increased travel between Denmark and Sweden and has led to increased regional integration. The Oresund Link has become more than just a transport infrastructure, it has also promoted other processes in the region such as increased integration between the employment markets on the Danish and Swedish sides.

5.2.2.3 Objective setting for PPP/PFI projects

UK case study findings suggest that in regard to MUTPs to be delivered through the PFI/PPP mechanism, there is a tendency for private sector bidders to interpret project objectives in a way that is most favourable to them, with the result that 'end products' match the financial aspirations of such bidders rather than what the public sector originally sought to deliver.

There is no apparent resonance amongst international case studies regarding the above – though it is suggested that this important point merits further study.

5.2.2.4 Stakeholder involvement in objective-setting

Summary insights from the UK case studies suggest that involving key stakeholders in setting project objectives (not merely consulting them 'after the event') is perceived as beneficial to a MUTP. However, achieving widespread agreement on project objectives can prove extremely difficult to achieve, especially when dealing with a fragmented institutional framework and manifold stakeholder agendas, both situations which introduce project risk. This is illustrated by Figure 5.2 below which shows from a sensemaking analysis²³ of the

²³ Results shown in this section of the report are from a sensemaking analysis of 1787 stories from the 21 projects where pre-hypothesis indexed data was supplied. 1240 Sense Making Items (SMIs) were attributed to 'complex projects', and 547 SMIs to 'simple projects'

pre-hypothesis dataset that as MUTP stories featuring more risk, tensions between project values become more relevant.

In addition, continued misunderstanding, conflict and 'expectation-creep' can be minimised if MUTP objectives are made clear to all affected stakeholders.

This aspect received very limited explicit attention in the international case study findings. Broadly, however, the findings do suggest very limited stakeholder involvement in objective setting for almost all projects.

Figure 5.2: A plot of prehypothesis narratives where a significant relationship was found between 'risk circumstances' and 'tensions between values' for complex²⁴ OMEGA MUTPs



Axis for Risk Circumstances 0 = Not at all risky 100 = Very risky

5.2.3 Project planning and delivery processes: contribution to 'success'

5.2.3.1 The importance of acknowledging key contextual influences

Regarding the importance of context, the UK case study findings provide the following insights:

- changing contextual elements are seen to contribute to the evolving nature of MUTPs. In
 particular, the planning process may become subject to fundamental shifts in the raison
 d'etre for a project as a result of contextual change brought about by political
 mantras/policy. Indeed, 'successful' MUTPs are often perceived to require high levels of
 faith, belief, commitment, trust and political intervention as noted above, political
 influence is likely to play a key role in almost all aspects of project planning and appraisal;
- context awareness on the part of project planners and delivery agents is considered to be a key factor in determining whether a project is likely to be successful - keen context awareness will normally be characterised by planning and delivery agents that are able to successfully mould projects in line with changing (often very fluid) contextual influences.

²⁴ Complex Projects: comprise those with many and varied short-medium-long-term objectives that extend beyond functional requirements of time, cost and specification and which may well encompass or express a distinct spatial/sectoral vision.

However, such awareness is rarely yielded by the establishment of formal context scanning mechanisms or processes - it is more usually the product of informal (often personal) processes conducted intuitively by individuals. In this context it is noted that the complex and often changing nature of the stakeholder environment poses particular concerns for MUTP planning and delivery agents.

Whilst the above findings are not explicitly mirrored in the international case studies, it is clear that a substantial number of them were greatly impacted by contextual influences, and changes thereto over time (as noted below in relation to Overall Research Question #3). This suggests that 'context awareness' did not always feature prominently in MUTP planning, appraisal and delivery – at least in a formal sense.

5.2.3.2 Seizing opportunities

A number of UK case study stakeholders pointed out that there are moments in time when it is opportune to 'seize the day' and take decisive action in the course of MUTP planning and delivery. Again, it is suggested that such action will normally be based on individuals/organisations possessing a very keen sense of context awareness that is made possible only through explicit or implicit context scanning. Moreover, some stakeholders consider that powerful MUTP 'players' may be able to manipulate context so as to achieve desired ends.

This matter was not *explicitly* addressed in responses to ORQs and ORHs prepared by Partners – however, it would seem likely that, given the acknowledged influence of key contextual elements on MUTP planning and delivery outcomes in many of the international case studies when circumstances were ripe for taking action, there is generic merit in the notion of 'seizing opportunities' (see findings relating to ORQ#3 below).

5.2.4 Need for institutional support

UK case study findings indicate that successful MUTPs generally require the establishment of an institutional framework which is able to address the multiplicity of expectations and stakeholder agendas that such projects inevitably encourage. This is seen to be especially important for those MUTPs that are expected/likely to function as 'agents of change'.

International case study findings support those of the UK. In particular, Partner findings point to the fact that institutional gaps and/or fragmented institutional networks can be especially problematical in terms of effective MUTP planning and delivery – again, notably when there is an expectation that a MUTP will fulfill key agent of change roles/functions. Key problems in this respect are seen to include delays and controversy in project implementation caused by multiple horizontal and vertical organisation structures that are poorly co-ordinated. It is important to acknowledge here that whilst the actual nature of such fragmentation/poor co-ordination is often context or culture-specific, the overall picture is essentially generic.

The above points are illustrated by the following examples:

France – all of the cases studies demonstrate the gap between the project 'boundary' and the institutions that were in place. The French Team concludes that a project's 'territory' often involves a number of organisations associated with central government and local authorities (or a grouping of several of them). This encouraged different kinds of grouping of local authorities, leading to the famous "institutional millefeuille" (many layered). The impact of this significant as MUTP funding depends very often on contributions from central government, regions or Departments. One of the impacts of this "institutional millefeuille" is

that it is very often a cause of delay and controversy in MUTPs, especially when the project is not managed at the relevant hierarchical level to achieve all of its objectives.

Netherlands – Randstadrail was impacted by a long history of stalemate and difficult negotiations which preceded the project as a result of fragmented organisations and stakeholder groups. The Ministry of Transport, the key funding agent, had to play a key role in brokering an agreement between them, which the Province had been unable to do.

Hong Kong – in regard to West Rail, the lack of co-ordinated transport policies and local district council politics mean that West Rail (Phase I) cannot perform as an environmentally friendly mode of transport in NWNT. Instead, it has constantly faced keen competition from pre-existing buses and minibuses that provide point-to-point services.

ORQ#2 – How well has risk, uncertainty and complexity been treated in the planning, appraisal and evaluation of such projects? and

ORH#3 – The level of competence in decision-making and planning in today's fastchanging world is best assessed by the adequacy of the treatment of risk, uncertainty and complexity and sensitivity to context – all of which are important demands on strategic planning.

As many of the UK and international case study findings relate jointly to the Overall Research Question #2 and Hypothesis #3, the latter are considered together here.

5.2.5 Major sources of risk, uncertainty and complexity

5.2.5.1 External versus internal sources of risk, uncertainty and complexity

UK case study findings indicate that the most significant sources of risk, uncertainty and complexity (RUC) originate from sources 'external' to MUTP planning and delivery systems and reflect the variable nature of the contexts into which they are placed. By contrast, internal project planning and delivery processes are seen as rather more stable and can be successfully 'controlled' or mitigated.

In addition, the inability to clearly discern, analyse and pro-actively respond to the full range, nature and scale of potential external project interfaces is considered to be extremely problematical for MUTPs and is a very significant source of RUC. Again, this is compounded by the fluid nature of context during the planning, appraisal, and delivery period and the silo nature of many project teams.

International case study findings similarly indicate that most key sources of RUC originate from the external environment into which MUTPs are placed. These include:

- global such as international financial crisis, oil price fluctuations and climate change (Partners also note that these considerations are often neglected in formal MUTP planning and appraisal processes);
- technical such as engineering or construction risk associated with local ground conditions (cited in most case studies), marine environments (e.g. Oresund Link and Western Harbour Crossing) and heritage considerations (including archaeological – especially in Greece);
- funding RUC associated with the (in)ability to source and deliver adequate funding and exposure to fluctuating interest rates, The relationship between uncertainty and finance

is supported by the pre-hypothesis data: Figure 5.3 from the sensemaking analysis²⁵ of the pre-hypothesis data, shows the positive relationship found between project uncertainty and project financing - as project stories feature more uncertainty, financing project development becomes more relevant;

- economic and financial the risk of lack of patronage of projects once they are in operation (especially pertinent for PPP/PFI projects dependent upon revenue streams from operations) and the scale of up-front investment required;
- institutional and political RUC generated by fragmented institutional frameworks, lack of comprehensive and effective legislative frameworks and changing political imperatives/agendas;
- stakeholders RUC associated with the multiplicity of stakeholders involved in project planning and delivery;
- lack of institutional learning RUC associated with the frequent treatment of MUTPs as essentially 'one-off' projects;
- technology RUC associated with the use of new technology. Here it is interesting to note the divergent nature of stakeholder insights regarding whether or not the use of new technology introduces RUC – essentially reflecting the difference between adopting 'tried and tested' methods/solutions (seen as more appropriate by Dutch stakeholders) versus accepting higher levels of RUC on the assumption that this can be controlled internally and can be a factor in reducing other risks (e.g. the Japanese experience of using new technology to drive down costs and thereby reducing the risk of funding problems).

Figure 5.3: A plot of prehypothesis stories where a significant relationship was found between 'project uncertainty' and 'financing project development' for simple²⁶ OMEGA MUTPs



Axis for Uncertainty Circumstances 0 = Totally certain 100 = Completely uncertain

Illustrative examples of the above are given below.

²⁵ Results shown in this section of the report are from a sensemaking analysis of 1787 stories from the 21 OMEGA projects where pre-hypothesis indexed data was supplied. 1240 Sense Making Items (SMIs) were attributed to 'complex projects', and 547 SMIs to 'simple projects' ²⁶ comprise those that are delivered to meet primarily short and medium-term functional objectives, often as a response to an

existing, self-evident problem or need.

Generic sources of risk, uncertainty and complexity cited in international OMEGA MUTP case studies

Australia – the success of the Sydney Cross City Tunnel project in the wider sense was seen to be highly dependent on a number of risk factors such as the global financial crisis, oil prices and climate change which were largely neglected in the selection of the tunnel project over other possible projects, such as public transport. Other generic types of risk mentioned by interviewees included - engineering or construction risk, ground conditions, financial risk, governmental or political risk, planning risk, and global risk.

Greece – it is noted that MUTPs are commonly treated in a regime of exceptionality and uniqueness in Greece, where contracts (either concessionary ones or Design-Build) were ratified as laws of the state, where their EIA requirements and other project related issues are also incorporated into laws. Projects have also been linked to an exceptionally important event such as the Olympic Games and exceptionally large funds were allocated to them.

Sweden – in relation to the Oresund Link, several interviewees express the view that the project was associated with a rather high level of risk and uncertainty due to the uniqueness of the project. The linking up of two cities, and in effect two previously separate labour and housing markets with important differences regarding legal and administrative frameworks and perhaps most importantly significant cultural differences, meant that predictions of transport volumes across the Link was associated with more uncertainty than would have been the case if it was a national project.

Economic, cost, revenue and funding matters

Australia – key RUC concerns in this respect were seen to include the risk that projects would not be used, or not sufficiently to justify the expenditure and other costs and/or residual uncertainty about public acceptance of pricing road space.

Japan – some interviewees regarded the scale of the Oedo Line project as one of the major sources of RUC (especially in relation to the major amount of funding provided by TMG and national government). Indeed funding risk was seen as especially significant for all three case study projects and this stimulated different responses in each case:

- political lobbying aimed at national government (Kyushu Shinkansen);
- cost reduction and private sector involvement (Oedo Line); and
- acceptance of increased costs due to solutions which sought to mitigate the risk of public opposition (Metropolitan Expressway).

Sweden – in regard to the Arlanda Link, a frequently recurring topic for interviewees was the number of lawyers involved and the juridical complexity of the negotiations. Several respondents pointed to the fact that given the novelty of the financing model in a Swedish context, there was very little knowledge in the public sector of how to handle a project of this kind.

Institutional/political matters

Australia – as noted above, the Sydney Cross City Tunnel was impacted by institutional fragmentation, a matter that was seen to be a significant source of RUC.

Japan – Kyushu Shinkansen was impacted by delays due to the necessity for national policy debate relating to privatisation (in light of the JNR deficit, work stopped between 1982 and 1987 prior to privatisation of the Japan national network). Moreover, locational matters were seen to have a key political dimension in that Kyushu is geographically some distance from

Tokyo Metropolitan Area, which might be directly or indirectly a disadvantage (directly, as a result of less support from national government, indirectly, due to different levels of commitment among Prefectures and municipalities because the distribution of benefits was unlikely to be even and because vertical (national-local) relationships might be more important than horizontal (local-local) relationships. For the Metropolitan Expressway, potential opposition from residents living along its route was seen as one of the most significant risks.

Hong Kong – the Hong Kong Team conclude that the most important contextual concern affecting development of the Airport Railway was largely seen to be concentrated in the political context surrounding delivery of the project within the broader context of the new airport. This refers to the political motives for announcing the ten ACPs, including the AR, as a mechanism to create public confidence, and generate economic activity and employment. The decision (in 1989) for a massive economic stimulus package in the form of the 10 airport projects "clearly had the scope for mistakes of immense proportions".

Netherlands – privatisation of the Dutch Railways caused friction with the national government and made it difficult to integrate HSL-Zuid into the national transport system. The Netherlands Team also note that increasing complexity of the HSL-Zuid project was not technical so much as institutional, due to the increasing number of actors involved in the decision-making process. This led to: (a) a far more open decision-making process than in the past and the need to acknowledge the impacts of the project across a growing number of scales and dimensions; (b) the involvement of more actors (and some confusion about their roles), and increased complexity with the redistribution of responsibilities within the public sector and between the public and the private sectors.

Sweden – as noted above, a contextual factor that made the planning and delivery process more complex is that it involved two national governments. The Swedish Team note that in the early planning phase, no one actor had control over the decision-making process and planning was conducted in a more chaotic way, as a mix of bargaining and co-operation between actors. In regard to the Southern Link it is noted that the grouping of projects can also be a source of RUC - another aspect of complexity mentioned by several interviewees was that the Dennis agreement contained many projects and the financing of several of the individual (road) projects were conditioned on the implementation of the ring road projects and the extraction of road tolls (which proved to be a hotly contested).

5.2.5.2 Risk, uncertainty and complexity and the pace of change in 21st Century

UK findings suggest that the 21st Century is characterized by a faster pace of change, resulting in significantly greater RUC in the planning and delivery of MUTPs. Key contextual forces/influences that are seen to lead to greater RUC in the 21st Century include: unstable economic circumstances; the use of new technology; climate change and energy concerns; the extended time required in completing MUTP planning and development processes. However, no significant resonance of the above finding was detected from amongst the international case studies.

5.2.5.3 Strategy components (and impacts) are difficult to identify and quantify

UK case study findings suggest that the changing circumstances (contexts) that surround the MUTP planning and delivery process, and the impacts they can have on moulding project approach/content, are difficult to identify (much less quantify), and are thus a source of RUC.

International case study findings similarly suggest that contextual change is often highly unpredictable and, as a consequence, extremely difficult to accommodate in MUTP planning and delivery processes. For example, in regard to the Western Harbour Crossing (Hong Kong), it was noted that "no amount of macro-level planning could have generated the scenario represented by the distress in Hong Kong following the Asian financial crisis: the property market collapsed, Government finances collapsed. Sometimes there is a perfect economic and social storm, and it happened in 1997-2003. WHC survived, but its future was irreparably undermined."

5.2.5.4 Lengthy planning and implementation period as a major source of risk

In the context of the UK case studies it is noted that the lengthy planning and implementation period for UK MUTPs (and other projects) was often cited by interviewees as the major source of risk and uncertainty – having particularly serious knock-on effects for private sector investors. Key issues in this respect centred around the fluidity of various contextual elements, especially the changing nature of stakeholder agendas, during the planning and appraisal period. That said, overly short planning periods for MUTPs are also seen by some interviewees as a major source of risk and uncertainty as decisions made in the early stages of a project without adequate levels of information and risk awareness can have high impacts later on in the project life cycle.

International case study findings reflect strong resonance with the view that gestation periods may be overly long or overly short, depending upon the prevailing context. This is highlighted by the following examples:

Netherlands – interviewees suggest that long gestation and implementation periods are important sources of RUC factors in general. However, in regard to the Beneluxlijn project this was not especially the case - since the decision-making process was well-advanced when the Beneluxtunnel was approved, which effectively ensured that the national government would finance the Beneluxlijn.

Sweden – in regard to the Oresund Link the lengthy gestation period for the project was an important factor for the handling of RUC. The first proper investigations were carried out by Danish and Swedish public actors during the 1960s and 1970s, and when the project was brought onto the agenda again in the mid-1980s a substantial knowledge base already existed, which allowed planners and decision makers to identify important gaps in information.

Hong Kong – the Western Harbour Crossing planning period was seen to be short, due to the perceived urgency to implement the project. This resulted from (a) the imminent handover of Hong Kong to China; (b) the need to complete airport-related projects. It is suggested that the level of urgency did not permit the adequate scanning/appraisal of potential outcomes, resulting in a situation in which traffic forecasts were fundamentally incorrect and the investment decisions based on them were flawed.

5.2.5.5 Clarity of MUTP objectives and risk, uncertainty and complexity

As noted above, there are somewhat divergent (and often conflicting) considerations to be taken into account in regard to having clear objectives at the commencement of project planning. Thus, for the UK case studies it was observed that:

• the existence of clear and firmly established (inflexible) objectives at the commencement of project planning is *not* always helpful in terms of mitigating risk in view of the likelihood that important contextual elements may undermine prevailing approaches and strategies (and the basic raison d'etre of some MUTPs);

- complex projects, with multiple spatial, sectoral and stakeholder interfaces and the consequent potential to function as significant 'agents of change', may require a period in which project objectives are allowed to mature through in-depth consideration of different stakeholder agendas and associated visions/objectives;
- the availability of clear project objectives in relation to relatively straightforward MUTPs is seen as a means to mitigate risks resulting from the interplay between different stakeholder agendas and, more broadly, contextual change over time;
- in particular, the existence of clear and straightforward objectives relating to the existence of a very self-evident problem/issue was most beneficial - not least in encouraging these projects to be seen as essentially 'benign';
- early project planning work may well be driven almost exclusively by perceived practicalities (especially in relation to cost minimization) while the evolutionary nature of the planning process may see the balance tip in favour of a more vision-led approach.

This matter is also referred to above (paragraph 6.2.1.2. In summary, international case study findings indicate that while the absence of conflicting objectives is seen as a means to reduce RUC, it is also suggested that flexibility is required to enable changing conditions (contextual influences) and unexpected circumstances to be adequately addressed. Indeed, it is seen that redundancy in the policy-making framework may allow a project to respond to (and incorporate) contextual change and that initially unclear objectives may evolve and become more 'concrete' through extensive negotiations between key players.

Highlighted insights from Australia and The Netherlands are as follows:

Australia – the absence of seriously conflicting objectives (e.g. between financial and service goals) was beneficial to the Melbourne City Link project. Moreover, the management of the objectives of involved parties so that alignment was retained was one of the key demonstrations of managerial competence in the project.

Netherlands – the Netherlands Team findings suggest that the policy-making framework should needs to allow for some 'redundancy' so that changing conditions and unexpected circumstances can be adequately dealt with. This approach enables parties to deal with conflicts in a constructive way and to incorporate emerging values and interests during the long process of decision-making and implementation. For Randstadrail, the project did not start with a clear overall statement, rather there was a continuing process of decentralised negotiation which eventually led to a lump sum agreement (about who would pay what). Most respondents found the agreement very successful in reducing uncertainties about who would finance eventual budget overruns. This also provided a great deal of transparency.

5.2.5.6 'Project control' and MUTP risk, uncertainty and complexity

UK case study findings suggest that: for most projects it is unrealistic to expect to be able to control all aspects of project planning and delivery – this may be despite undertakings given to politicians and the public and the expectations of project managers; only the later project lifecycle stages (construction and operations) are seen as capable of fuller control; there are likely to be more difficulties in exerting control during MUTP planning periods as a result of competing stakeholder agendas and the interplay of political influence, which are especially prevalent in the UK, and; for a relatively straightforward MUTP 'tight control' as a means to mitigate risk is seen as clearly possible - particularly when there exist clear objectives that are well understood by stakeholders.

There would seem to be strong resonance with the above from international case study findings. In particular, it is noted that the ability to detect, analyse and control *all* potential sources of RUC is likely to remain problematical, especially during the planning and

appraisal period of the MUTP lifecycle (as opposed to the project implementation stage). Similar to the UK case study findings, it is also suggested that complexity is likely to increase and the level control to decrease with the increasing expectation that a multiplicity (and large number) of stakeholders should legitimately be involved in MUTP decision-making processes. Underpinning much of this, and in relation to the UK case studies, is the key question of 'who is effectively in control of the decision-making process' – a matter that is not always abundantly clear as a result of the many stakeholder interests at play.

Examples which highlight the above are as follows:

Netherlands – the Netherlands team conclude that the inability to determine and monitor all risks and contextual influences means that 'control' is difficult (it is simply not possible to monitor all risks and contextual developments) and, as a result, it is believed that the focus should therefore be on *key* risks and uncertainties. It is also important to understand which critical risks *must* be controlled under any circumstances, because of the disproportionate damage they can inflict on a project (e.g. the areas/sectors impacted by the project, project programme and financial budget, public image of the project.

Sweden – the Swedish Team concur that MUTP planning and appraisal processes are seen as much more complex than the implementation phase. In all three case studies the planning processes were both complex and fraught with controversy. The main source of RUC was thus associated with political influence. That said, technical and economic considerations were an important part of the political debate and the fact that a project may imply great technical and economic risks increases the complexity of the political process. An important conclusion is that in the early planning phase no one actor has control of the planning process and the decision process moves forward through a mix of bargaining, confrontation and co-operation between a multitude of actors with different agendas. These processes are thus highly chaotic. In the Oresund Link, for example, one important decision-making process took place within the Swedish Social Democratic party. Another important actor in the early phase was an industrial lobbying group lead by the chairman of Volvo, Pehr G Gyllenhammar. In the Southern Link the early planning process was equally chaotic involving political parties, local environmental groups and government administrations. When the final decision is approaching the decision process tends to become more closed and the main actors take more control (e.g. the governments of Sweden and Denmark in the Oresund Link).

Hong Kong – the Hong Team suggest the need to distinguish between the planning and the delivery phases. In the case of the Western Harbour Crossing the planning phase lacked control but the 'delivery' phase was undertaken very effectively.

5.2.5.7 MUTP interfaces and risk, uncertainty and complexity

In the context of the UK case studies it was found that: failure to take account of all relevant stakeholder programmes that may impact on planning and delivery, through extensive and comprehensive forward planning based on relevant information, may expose MUTP project planning and delivery to RUC; there are potential shortcomings associated with current systems and mechanisms to assemble all relevant information regarding project interfaces at the planning stage - when the many, various and changing stakeholder agendas (and other contextual influences) are frequently difficult to discern.

International case study findings suggest a rather different take on project interfaces and RUC. In particular, it is suggested that one of the key characteristics of RUC associated with MUTPs is that they are often experienced at the interfaces between different disciplines and thus involve 'systemic' risk - as noted by the French Team, risks associated with MUTPs are often produced at the interface between different specialties - for instance, structure,

geology, meteorology etc. – hence the risk tends to be 'systemic'. By contrast, the Hong Kong and Greek Teams conclude that interfaces between client/contractor/regulator can be managed effectively through contractual mechanisms.

5.2.5.8 Politics and MUTP risk, uncertainty and complexity

UK case study findings suggest that:

- the planning period for MUTPs is often highly politicised and is therefore perceived to be risky for project sponsors. Insufficient political will can often become a significant source of risk - primarily resulting from expediency or pragmatism brought about by short-term political horizons;
- yet, it would seem that there were no formal monitoring mechanisms in place to assess the RUCs stemming from insufficient political will, inappropriate governance and regulation – more usually this takes place on an informal basis using well established business/government networks;
- consensus-building is seen as critically important at the project planning stage as a means to mitigate risk. This is particularly significant at the highest political levels given that the size/cost/potential impacts of MUTPs such as CTRL make it imperative that key formative decisions are taken at the heart of government;
- project champions are, by necessity, very astute consensus builders. Indeed, the garnering of essential project support is seen as based on political consensus building and persuasion and an acute awareness of what is likely to be politically 'acceptable' (suggesting a very fine-tuned awareness of context).

In regard to the international case study findings it would seem clear that the sheer frequency with which politicians are cited as playing a particularly pivotal role in moving projects forward (or delaying them), suggests that 'politics' and RUC are inextricably linked. Indeed, based on the international case study findings it can be concluded that there is strong resonance with the UK case study findings, which can be summarised as follows:

- the relationship between political leadership and political will is seen as particularly important for MUTP planning and delivery – especially when accompanied by a powerful rationalising narrative. However, one Partner cautions that insufficient political will should not be seen as a problem, but rather a reflection of a legitimate democratic process;
- more generally, it is suggested that the politicisation of MUTPs as a result of changing political cycles and ideologies may become a significant source of RUC;
- political influence may be exerted at all hierarchical levels from national to local government institutions – and impacted at the international level in at least two country contexts (Sweden and Hong Kong – see below);
- MUTPs may, themselves, become sufficiently politically significant (controversial) as to impact on government elections;
- organisational and political complexity may become barriers to effective MUTP decision-making as a result of the existence of modal silos within government and a multiplicity of involved institutions;
- project champions are seen as especially important in regard to building consensus for project planning and delivery.

Figure 5.4, from the sensemaking analysis²⁷ of the OMEGA pre-hypothesis dataset, presents the significant relationship found between project 'uncertainty circumstances' and

²⁷ Results shown in this section of the report are from a sensemaking analysis of 1787 stories from the 21 OMEGA projects where pre-hypothesis indexed data was supplied. The sample data consists of 1240 Sense Making Items (SMIs) attributed to 'complex projects', and 547 SMIs attributed to 'simple projects'

'political intervention'. As pre-hypothesis stories feature more political intervention, uncertainty circumstances become more relevant.





Axis for Uncertainty Circumstances 0 = Totally certain 100 = Completely uncertain

Specific examples of the above are seen to be:

Australia – for the Perth-Mandurah Railway there was strong emphasis on the role of political leadership (with all its connotations of power, success and reputations 'on the line'). Yet, political leadership was accompanied by powerful rationalising narratives and effective stakeholder management. In contrast with both Melbourne City Link and the Perth-Mandurah Railway, the Sydney Cross City Tunnel was not given undivided and unequivocal political support. There was apparently some conflict and rivalry between Ministers. A view was expressed that the bureaucracy in NSW has been highly politicised in recent years, with bureaucrats increasingly unwilling to question projects. Indeed, interviewees pointed to the difficulty of maintaining continuity over the life of different Parliaments (a similar point was also made by the Greek Team). Also in regard to the Perth-mandurah Railway, many interviewees mentioned the critical role of the Minister and the top leadership in promoting and 'championing' the project. The Minister adopted a consensus-building style, but was prepared to take strong action and be very firm when the occasion demanded. The latter was probably assisted by having built a solid consensus in favour of the project.

Netherlands – in regard to Randstadrail it was noted by one interviewee that 'the trick of getting a project through is to generate enough political will'. In this case, several parties showed a lack of political will at two points: the Ministry of Transport found the first Randstadrail proposals too expensive (one interviewee suggested it was a game of looking for opportunities, especially when there was a change of minister). However, this reduced the estimated cost by reining in aspirations, which also reduced complexity. During the years from concept to decision there was insufficient political will to bridge the modal choice of train, tram or metro - this resulted in having both modes. All municipalities along the line benefited from the introduction of this transport system.

Hong Kong – the Hong Kong Team suggest that the politicisation of projects was seen as a significant source of RUC. Political negotiations between the Chinese government and the British (Hong Kong Government) led to disputes about financing the new Chek Lap Kok airport project in general and the Airport Railway in particular. This led to a delay in the project's completion by one year. That said, political will to ensure the project's completion was maintained even during the uncertain times that characterised this period.

Sweden – in respect of the Oresund Link, interviewees mentioned the involvement of two national political and administrative systems as well as the unprecedented magnitude of the project as factors adding greatly to its complexity. Moreover, it would seem that there were opposing ideologies at play in that the Swedish Social Democratic government favoured a solution with minimal public involvement and risk taking, while the Liberal/Conservative Danish government strongly proposed a similar set up to the Great Belt project based on state guaranteed loans. The Swedish Team also note that MUTPs may become very significant political issues - a recurring topic regarding the Oresund Link in many of the interviews was how the environmental permission process almost led to a major political crisis when the government's final decision to go ahead with the project in June 1994 led the minister of the environment at the time to step down from his post, which threatened to split the coalition government in power. That the decision-making process came close to toppling the government in power highlights the complexity of the political context in which the project was formed. In regard to the Southern Link, the planning process was characterised by controversy and complexity and the project managers were faced with a challenging and changing political context. Several interviewees were highly critical of the political decisionmaking process and certain political parties and/or individuals involved in this process. Some of these proponents make a distinction between the rational planning process and the irrational political decision-making process.

USA - the USA Team cite organisational and political complexity as barriers to effective MUTP decision-making. They explain that in the United States transportation planning and operations are characterized by political and organizational complexity in the form of multiple 'modal silos'. At the federal, state and local levels, separate agencies are responsible for air, rail, road and mass transit - the agencies have few incentives for co-operation and little is done in the form of multi-modal planning. However, megaprojects typically involve more than one mode of transportation, and strategies must be developed to deal with this organizational fragmentation and political complexity. All three case study projects were significantly affected by these silos. For example, in relation to the Big Dig, three sets of factors raised challenges for the project: organisational fragmentation of transportation services in the US federal system generally and particularly in the Boston metropolitan area; a pluralistic local political setting, requiring a balance of multiple constituencies to sustain support for the project; and the technical construction features of the project, requiring tunnelling in the centre of a major metropolis while continuing overhead highway operations. Similarly, the Alameda Corridor and Air Train required co-operation among multiple public and private entities.

5.2.5.9 Trust, transparency and MUTP risk, uncertainty and complexity

UK case study findings indicate that:

- the levels of 'trust and transparency' present in regard to significant project dealings between key players will often be viewed differently by different stakeholder groups - who themselves are frequently suspicious of negotiations that take place behind closed doors 'for commercial reasons;.
- the risk of losing stakeholder trust is perhaps most often found when changes in the objectives of a project or its fundamental raison d'etre are not made clear. Such

changes, whether abrupt or subtle, generally reduce levels of trust and transparency unless a full explanation is provided to all affected stakeholders;

- planning and delivery processes conducted in a way that emphasises 'working together' and close personal relationships based on trust are seen as far more effective than an adversarial approach in which one party is seen to be attempting to 'win';
- networking and the establishment of a 'trust environment' are seen as vital by most stakeholders, particularly in regard to overcoming 'silo thinking'.

International case study findings broadly support the notion that the creation of a 'trust environment', based on an appropriate degree of transparency in the decision-making process, represents an essential means to address concerns over RUC. Key issues raised in this regard were:

- developing relationships based on trust and transparency is seen as having long-term benefits, particularly in the context of public and private sector bodies/organisations that expect to work together on other projects in the future. Trust is thus often based on longterm relationships, a track-record of trustworthiness and effective information sharing which can be jeopardised when organisations are seen to be attempting to gain the upper hand at the expense of other involved players;
- however, some note the difficulties associated with achieving an appropriate balance between the need for transparency associated with democratic accountability and the often legitimate concerns of private sector parties involved in project delivery regarding the sensitivity of key financial data;
- there is a general acceptance that stakeholders are demanding ever increasing amounts of information regarding the MUTP planning and delivery process.

The above points are specifically illustrated by a series of observations from the Netherlands Team, as follows: the Netherlands Team note the difficulty in achieving an appropriate balance between the transparency demanded by a democratic system and the economic reality of putting projects out to public tender; based on insights in respect of Randstadrail, it would seem clear that stakeholders need to be able to trust each other and the information on which their negotiations are based – seeking short-term profit can create mistrust in the longer term when stakeholders feel their faith has been violated, and; in regard to transparency it is noted that information sharing needs to be based on unbiased and accurate data: one Beneluxlijn interviewee explained that: "One of the most deadly sins is to promise things you cannot deliver or to say things that are not true. It costs a lot of investment to win people's trust but it is easily lost."

5.2.5.10 Risk share and PPPs/PFIs

UK case study findings suggest that:

- for PFI/PPP projects, determining an appropriate degree of risk-sharing between the public and private sectors is extremely problematical and is seen as requiring considerable skill and experience;
- transferring high levels of risk to the private sector carries with it the risk that the project scope/nature may change from that originally conceived – as a result of re-negotiation of terms and/or the private sector delivering the project it can best 'afford';
- the private sector will usually have a limit to their ability to successfully mitigate financial risk which is much lower than that of the public sector (often resulting in the public sector ultimately inheriting all risk in the case of large 'risk events');
- risk management is seen as an imprecise 'art' that requires the type of expertise that is not presently available in the public sector;

- balancing risk management between the public and private sectors is difficult when gains may only be realised in the long-term, while political horizons are typically short-term;
- appropriate levels of risk sharing will likely need to be established at the outset and this should include the analysis of potential project winners and losers.

Again, Partner findings largely concur with those emanating from the UK case studies. In particular, it is noted that the respective motivations of the public and private sectors rarely coincide, making the determination of an appropriate risk share especially difficult. This is so because, for projects that rely on patronage (e.g. concessionary projects such as tolled motorways), the private sector is chiefly concerned with the risk associated with eventual under-use leading to inadequate revenue streams, while public sector concerns are more likely to be focused on the risk of criticism from the general public (voters) arising from opportunity costs and perceived financial over-exposure. It is further noted that while PPP/PFI concessionaires may bear revenue risks associated with under-use, they can often respond by increasing user charges which can have knock-on effects on the wider network. However, the public sector remains exposed to political risks associated with project failure.

Figure 5.5, from the sensemaking analysis²⁸ of the OMEGA pre-hypothesis data shows a significant negative relationship between project 'uncertainty circumstances' and 'private sector power'. The more project stories feature private sector power, the more relevant project certainty becomes.





Axis for Uncertainty Circumstances 0 = Totally certain 100 = Completely uncertain

Examples that highlight the above UK and international case study findings are as follows:

²⁸ Results shown in this section of the report are from a sensemaking analysis of 1787 stories from the 21 OMEGA projects where pre-hypothesis indexed data was supplied. The sample data consists of 1240 Sense Making Items (SMIs) attributed to 'complex projects', and 547 SMIs attributed to 'simple projects'

Australia – for Melbourne City Link the private sector consortium bore most of the costs and thus the financial risk of under-use (the greatest risk for the project resulted from the residual uncertainty about the acceptance by the public of pricing road space). Similarly, the primary risk for the Sydney Cross City Tunnel was that motorists would not use the infrastructure (although this was a PPP and the consortium bore the financial risk, ultimately going into receivership, the government was left with the political odium of perceived failure. Indeed, in Sydney there is a sense that the early projects such as the Sydney Harbour Tunnel were not satisfactory for the government, which took all the risk concerning traffic forecasts and guaranteed a minimum income for the tunnel operators. The Australia Team also noted that the opportunity cost to the public of handing over a major public asset to private hands is a real concern. In this regard it has been argued that, for Melbourne City Link, the cost of borrowing would have been less if the debt had been incurred by the public sector, and the overall cost to the public of the project over its full life would have been less than the PPP option. Politically this option was ruled out by the logic of reducing public sector debt.

Netherlands – in regard to HSL-Zuid interviewees held different views as to whether the private 'design-finance-build and maintain' (DFBM) contract for the non-civic infrastructure was 'sustainable' – one argued that commercial pressures forced the contractor to design a product which was low in maintenance cost while another argued that PPPs are 'terrible' for sustainability because contractors build everything as cheaply as possible.

Sweden – in regard to the distribution of risk between the state and the private consortium appointed for the Arlanda Link, some interviewees argued that since the state had to act as guarantors for a loan of SEK one billion, as well as paying for many other sections of the entire project, the final share of economic risk for the private consortium was rather limited. The more critical commentators also argued that while the state gained an important piece of infrastructure at less cost and thereby with less financial risk than compared to the normal case, this came at the expense of important disadvantages from the public perspective - e.g. the obstacles to regional integration and the long duration of the contract with the private consortium.

Hong Kong – the need (and scope) for the private sector to make a profit meant that tolls on the Western harbour Crossing were raised to compensate for insufficient demand. This meant that the project objective of relieving congestion was not achieved.

USA – the USA Team conclude that a common element of their case study projects was the limited ability to share revenue risks with a private partner - the DBOM contract did not include giving the private partner responsibility for collecting fares and taking any revenue risk. In the case of the Alameda Corridor, the revenue bonds helping to finance the project were backed by user fees, and the railroads were at some risk for higher fees - but the bonds were issued by a public entity and that authority carried the ultimate risk for the bonds. In the case of the Big Dig, little attention was paid to future user charges, particularly any future toll increases on the turnpike portion of the project. Public entities issued bonds for the project after federal funds were capped, and they assumed the risk for sufficient revenues from taxes or tolls to repay the bonds. The team also noted that financing arrangements have important implications for project design and implementation, as follows: projects which depend heavily on user fees (and include the potential users as active stakeholders) are more likely to assign priority to keeping design constraints within a predetermined budget and to sustain pressure to keep project costs within budget during construction; projects relying heavily on external funding are more likely to suffer cost escalation, especially when the outside funders are subject to political pressures from local By definition, megaprojects require large sums for construction and constituencies. additional ongoing operational support. The three case study projects vary notably in their sources of funding for construction, and the nature of the financing arrangements appear to have significantly influenced project outcomes.

5.2.5.11 Risk, uncertainty and complexity: extracting benefits from MUTPs

UK case study findings suggest that: MUTPs may encounter considerable risk and uncertainty in regard to the extraction of benefits through the planning system. Key 'risk issues' in this regard are considered to encompass: lack of public sector expertise and negotiation skills; lack of adequate public sector tools and institutional support; the optimal scale of such benefits is often at odds with the scales of the institutions trying to extract such benefits; insufficient political will to take a tough stance in the face of short-term political horizons, and; frequent staff turnover during negotiation processes, and; MUTPs that are tied to real estate/regeneration projects are often unable to produce real benefits in the short-term due to the lengthy period required to complete such developments.

No explicit resonance was found in regard to the above from the international case studies.

5.2.5.12 Risk, uncertainty and complexity and MUTP freezing

UK case study findings suggest that: determining the stage at which a project can be effectively frozen is an important factor in the project lifecycle, as contextual change thereafter may be very difficult to accommodate, thus exacerbating RUC; given that many, if not most, MUTPs are necessarily 'evolutionary' in nature, it may be argued that such projects should only be frozen after all contextual eventualities have been taken into account - this may mean that matters such as cost and programme control remain problematical for considerable and; а period of time, once projects have entered the implementation/construction stage they: (a) often have to be modified to cope with unexpected conditions, and; are notoriously difficult (costly) to change in terms of their fundamental design specification - this has implications for the use of innovative technology.

Strong resonance with the above can be detected from the international case study findings (especially those of the Netherlands and Hong Kong – HSL-Zuid and Western Harbour Crossing, respectively) which also demonstrate that determining the appropriate time at which to 'freeze' a project is exceedingly difficult. One key point made is that the potential for managing RUC in MUTP planning, appraisal and delivery declines exponentially as decisions are made which fix project objectives, scope and size, as well as the institutional delivery mechanisms – not least because of significant contextual change that may take place thereafter in terms of (for example) shifting political imperatives and the wider economic climate. This perhaps suggests the need to avoid being over-prescriptive when setting the technical parameters in the early stages of a MUTP and maintaining flexibility and adaptability in project design for as long as possible. Conversely, delay in establishing financial arrangements based upon a 'frozen' project design/scope can also lead to its' effectiveness being challenged by competitors in the market.

Figure 5.6 taken from the sensemaking analysis²⁹, of the OMEGA pre-hypothesis dataset displays the significant negative relationship found between levels of project risk and 'implementing the project' As stories feature more certainty, the implementation stage of the project lifecycle becomes more relevant;

²⁹ Results shown in this section of the report are from a sensemaking analysis of 1787 stories from the 21 OMEGA projects where pre-hypothesis indexed data was supplied. 1240 Sense Making Items (SMIs) were attributed to 'complex projects', and 547 SMIs to 'simple projects'

Figure 5.6: A plot of pre-hypothesis based narratives where a significant relationship was found between 'risk circumstances' and 'implementing the project' for complex MUTPs



Axis for Risk Circumstances 0 = Not at all risky 100 = Very risky

5.2.6 Mitigating the effects of MUTP risk, uncertainty and complexity

5.2.6.1 Increased risk, uncertainty and complexity in 21st Century requires strategy formulation

UK case study findings suggest that such targeted responses are likely to include:

- better understanding of the influences associated with prevailing and emerging future contexts;
- identifying and planning for the contextual changes that may be brought about by MUTPs, backed up with effective monitoring and decision making;
- the preparation of planning and implementation strategies and programmes that are robust but also capable of ready adaptation in the face of changing needs/demands and contextual items;
- the use of scenario building and testing within a wide range of stakeholder groups this is seen as a key means to seek to discern future contextual influences on project planning and delivery;
- greater stakeholder involvement in the planning and delivery process and identification of prevailing and emerging/changing stakeholder motives and agendas.

While Partner findings did not explicitly relate to the heightened exposure to RUC associated with the 21st Century, they did acknowledge the key role played by strategy formulation as a major mitigation measure which characterised a number of case study projects. Examples of these are as follows:

France – referring to Emmanuel Chadeau (Economie du 132isqué: les entrepreneurs 1850-1980, Editions orban 1988"), it is noted that an ".....entrepreneur is not necessarily risk averse – he may be both a risk taker and a 'risk reducing agent'" In the case of Millau Bridge, both the public administration and Eiffage were simultaneously risk taking and risk reducing agents, which reflects the innovation process at play. There may be two explanatory elements here: the importance of the engineers on both sides and their common technical culture in relation to the 'technical adventure' being undertaken, and; the strong state influence which both stimulated risk through innovation, while at the same time cushioning the consequences of this by introducing legal guarantees. In Millau, this taste for risk taking and risk reducing is evident also in the Eiffage attitude towards financial risk (the decision to self-finance the construction as a basis for later negotiations with the bank).

Greece – interviewees generally agree that the lack of strategic planning heightened exposure to RUC in all three case study projects. They cited inadequate public participation and the ability to absorb feedback from stakeholders, the lack of a strategic approach to urban and regional planning, the limited capabilities of public institutions and the inability/unwillingness to learn from the constructive evaluation (ex-post) of projects and plans as key reasons why strategy formulation did not feature strongly in the case studies.

USA – the USA Team note that successful megaprojects require viable strategies for overcoming organizational and political complexity: in some cases, the commitment of a high level elected official such as a state governor may be a sufficient mechanism, but the possibility that election cycles may lead to changes in the officeholder make this a risky strategy. Each of the case study projects developed a different strategy for dealing with this complexity, with varying degrees of success, as follows: JFK AirTrain - no new entity was created; instead, project sponsors relied on the leadership of the governor and his designated representative to facilitate resolution of inter-organizational conflict. His leadership provided the key mechanism for bridging the organizational conflicts and complexity; Big Dig - no successful mechanism was developed. No new entity was created, and the implicit strategy was to rely on the political clout of the governor, who oversaw the major organizations involved. However, unlike the AirTrain, there were multiple governors and transportation secretaries over the life of the project including changes in party affiliation of the governor. While the project was never dropped, it was periodically reconsidered and redesigned. Alameda Corridor - a new entity was created to finance and manage the project. The governance of this entity underwent a significant change during the course of project planning, eventually eliminating several local governments that did not have a direct financial stake in the project. The revised authority proved a viable mechanism for dealing with the complex negotiations and financial arrangements.

Japan – in the case of the Metropolitan Expressway, the strategy of dividing the parent 'C2 project' into smaller parts, and implementing planning and construction from the easiest to the most difficult part was seen as helpful in acquiring much-needed knowledge in seeking a possible solution to achieve the project objectives.

Sweden – interviewee responses in regard to the Oresund Link suggest that an important way to handle the uncertainty associated with the project in the decision-making process was to strategically frame the functionality of the project as performing both an important local and regional/national and international role. Some interviewees argue that a shift in focus from a national and EU perspective to a focus on the local and regional functionality of the project was a key event enabling the process to proceed and gain sufficient support. Others suggest that in its earliest stages (1930s) the project had been framed as a matter of local and regional importance and that the introduction of the (inter)national perspective was the key for mustering the political support needed for enabling the project to proceed.

Hong Kong – here it is noted that while contextual influences were not easily predictable, Hong Kong benefited from having master planning strategies that provided the framework for the case study projects. Thus context for MUTPs in Hong Kong was driven by the overall prevailing strategic plans for the territory at the time- namely the Territorial Development Strategy and Port and Airport Development Strategy.

The international case study findings also touch on a number of *approaches* associated with the management and mitigation of RUC. These include contractual mechanisms (e.g.DBOM); financing mechanisms, and; the role of the state as producer and/or regulator, as follows:

USA – the multiple uncertainties related to MUTPs create significant risks that projects will suffer delays and cost increases and may fail to achieve the volume and revenue targets set for them. In each of the three case studies different techniques were used to cope with these risks, and they had varying degrees of success. Air Train sponsors had two strategies for curtailing risk: they opted for established technology in the design for the project, seeking to avoid risks related to newer, unproven, technology (see below); they used a DBOM contract for procurement, passing much of the cost related risk onto the private partner. Alameda Corridor sponsors also used procurement techniques to curtail risks. Large segments of the project were built using Design-Build (DB) contracts. This differs from conventional U.S. public sector procurement in which public agencies do the design work and then put out a fully designed project for bid for construction. The DB mechanism allows private partners to take responsibility for design and construction, often speeding work, eliminating conflicts over design feasibility and creating incentives for a design that is easily built. Big Dig project sponsors relied on a partnership with private partners in which they took responsibility for overseeing work, but did not assume major cost risks. This joint venture model did not work to share risks, and, in fact, created incentives for cost escalation since the private partners were paid fees based on total project cost.

Sweden – the decision to finance outside the state budgets via user fees can be perceived as an important way of reducing the financial risks and may become a basis on which a project becomes politically possible. For the Oresund Link, while the private financing model was untried in Sweden, the Danes used a similar approach for the Great Belt Link project, which served as a model in terms of reducing uncertainty.

France – it is interesting to compare tools and techniques employed by the state in France as a 'producer' (designer and project manager in the initial stages of a project) and as a 'regulator'. As a producer, the state faces major project complexity and needs the expertise of numerous scientific and technical partnerships. As a regulator, the tools used concern the way in which it is possible to keep the concession contract under control so as to ensure that the project is delivered to the specifications required.

5.2.6.2 Need for scanning and constantly monitoring risk

UK case study findings suggest that: contextual matters are seen as likely to represent a significant source of RUC, and thereby an influence on project planning and delivery. Hence, their regular and sustained monitoring is critical. However, this key activity may frequently take place through well established (informal) relationships and networks as part of consensus building, and; unexpected occurrences will almost always arise and some of these can become especially critical. This is most prevalent at the project planning and appraisal stage but can also impact on project implementation.

No strong resonance was detected from amongst the international case studies in regard to the above.

5.2.6.3 Robustness and adaptability

UK case study findings suggest that: MUTPs that are subject to changing contextual influences may well need to be delivered through a flexible, evolving and responsive approach which is capable of addressing and accommodating such change, and; as noted above, it is believed that there are moments in time that present ideal opportunities to take decisive action in pursuit of specific ideas, agendas and decisions. This suggests that planning and implementation strategies need to be sufficiently robust and adaptable to be able to respond rapidly to the opportunities afforded by such moments in time.

This matter received only limited explicit attention in the international case study findings. Those that did refer to the need for robustness and adaptability (Netherlands and Hong Kong) cited the ability of MUTP planning and delivery to respond to the evolutionary nature of projects as a positive characteristic while another noted that inflexible financial/funding arrangements can be especially problematical. In summary, a robust but flexible project vision was seen as advisable - i.e. one based upon an overarching shared sense of direction but able to incorporate differing interests and points of view during the planning and appraisal process.

Figure 5.7, from the sensemaking analysis³⁰ of the OMEGA pre-hypothesis data, shows the significant relationship found between project uncertainty circumstances and major changes in project scope. As project stories feature less risky circumstances, major changes in project scope are become more relevant.

Figure 5.7: A plot of pre-hypothesis based narratives where a significant relationship was found between project 'risk circumstance' and 'major change in project scope' for simple MUTPs



Axis for Risk Circumstances 0 = Not at all risky 100 = Very risky

Netherlands – the Randstadrail project was seen as being sufficiently flexible and adjustable during a prolonged decision-making period. For example, the budget was

³⁰ Results shown in this section of the report are from a sensemaking analysis of 1787 stories from the 21 projects where prehypothesis indexed data was supplied. The sample data consists of 1240 Sense Making Items (SMIs) attributed to 'complex projects', and 547 SMIs attributed to 'simple projects'

changed from EUR 6bn to less than EUR 1.5bn. The design of the tram tunnel in the Hague was an essential element but not part of the project. The project sponsor argued that it was necessary but that he could not say so because the national government feared setting a precedent - i.e. the decision to build the tunnel would be seen as automatically implying approval of Randstadrail. However, by making the tunnel both suitable for normal trams and of a size that could also accommodate the metro, it became a flexible element of the decision-making process – necessary but not dependent on the decision to build Randstadrail. The Netherlands Team also suggest that strategic framing' of the project's mission/vision is crucial in providing a strong but robust shared sense of direction and should be capable of accommodating contextual changes and the emergence of different rationales that may arise.

Hong Kong – the BOT arrangement that was adopted for the Western Harbour Crossing was seen to lock the government into a contractual agreement which limited their subsequent room for manoeuvre.

5.2.6.4 'Time to breathe' and MUTP risk, uncertainty and complexity

UK case study findings suggest that: giving projects 'time to breathe' is seen as a positive influence in planning and delivery (and means to mitigate risk) for those that are complex and (particularly) involve much broader objectives than the simple delivery of a piece of transport infrastructure; however, even for complex projects, some see a time to breathe as rather problematical by virtue of prolonging planning, delivery and uncertainty, and; by contrast, for projects that are considered to be relatively straightforward, the availability of a 'time to breathe' may not be seen as a beneficial means to mitigate risk. In the context of a relatively straightforward project a 'time to breathe' may be seen as potentially dangerous - most interviewees consider that project planning and implementation is already too time consuming, especially when there is a self-evident problem to be addressed.

Only one international case study explicitly alluded to this matter (Japan's Oedo Line – see below) - the project was temporarily abandoned due to public funding difficulties but then reviewed and eventually delivered at a lower cost. However, as noted in transcript of discussions in Appendix 10, the notion of a 'time to breathe' (or period of reflection) coupled with the acknowledged characteristic of many MUTPs that they will almost inevitably evolve over time in response to changing contextual influences, was widely supported in discussions with Partners at the Perth OMEGA Workshop in July 2011.

Japan – in regard to the Oedo Line, the energy crisis in 1973 significantly worsened the financial climate which forced the Government to abandon the project. The development plan of the Line was changed in the 1980s, with revised passenger demand forecasts and accompanying cost reduction measures. Thus, in the case of the Oedo Line, reviewing the original plan improved the project's profit prospects and enabled it to proceed.

5.2.6.5 Community engagement as a means to mitigate MUTP risk

UK case study findings suggest that:

- full community engagement from the outset is seen as a means to mitigate downstream RUC associated with stakeholder relations. Indeed, effective consultation with relevant stakeholders can enable the successful adjustment/revision of project objectives, management of project expectations and help to speed up the delivery process;
- however, such engagement is less effective if undertaken once project objectives have been firmed-up - and can actually increase levels of confrontation;
- determining stakeholder motives and legitimacy is often extremely difficult and may require specifically targeted outreach exercises;

 successful MUTP planning and delivery agents are likely to be those who are characterised by a strong intuitive sense of the nature and agendas of stakeholder groups and networks - and the likelihood that these will change over time.

The international case study findings indicate that community engagement is variously seen as:

- providing a means to mitigate RUC created by potential public opposition;
- an opportunity to build consensus and public support;
- an opportunity to identify dominant/influential stakeholders;
- an opportunity to communicate relevant project information to concerned stakeholders.

However, in a number of country contexts stakeholder engagement is seen as somewhat lacking due to centralized decision-making and/or an overly defensive stance on the part of the public sector. Particular issues appear to be associated with: the need for early (i.e. at project conception stage) and sustained community engagement; the difficulties of sharing information about technical aspects with stakeholders who have little background knowledge/expertise, and; the advisability of establishing an interactive flow of information between stakeholders and project sponsors which can assist the latter to understand the consequences of their actions and identify potential social impacts.

Illustrative examples from Partner findings are shown below:

Greece – in the case of Attiki Odos, a number of respondents suggest that context sensemaking requires stakeholders to engage early in the project planning process. Centralised decision-making in Greece is also seen as a barrier to effective community engagement in that it is the historically established modus operandi and decision-making practice of the public sector that ensures that key decisions remain centralised, politicised and lacking in stakeholder involvement.

Australia – in regard to the Melbourne City Link it is noted that the concessionaire (Transurban) took care both to consult with the public and monitor public reaction, and to design an exceptionally user-friendly and flexible system for toll collection. For the Perth-Mandurah Rail link the Australia Team acknowledge that managing the stakeholder relationships to achieve a degree of consensus around the project was a particularly important leadership task. In the case of the Sydney Cross City Tunnel it was seen that the decision-making process might be categorised as one interviewee put it: a "DAD approach to projects, the Decide, Announce and Defend process." This is supported by the nature of the consultation, which was generally restricted to those living on the proposed route of the tunnel, and those directly affected. A broader consultation process concerning the effect on the city was not conducted publicly. A key risk illustrated by the Sydney case is that projects which are unsuccessful damage community willingness to support future projects and undermines faith in the government and government processes. This is a form of political risk which is perhaps at times insufficiently managed.

Netherlands – the readiness and ability of the HSL-Zuid project team to communicate and interact with a broad, diverse public about the scope and implications of technical choices was seen as essential in reducing and managing risk and uncertainty (this point is also made in relation to Beneluxlijn). However, it is also noted that the complexity of MUTPs lies less in their technical aspects but rather in the need to share complex technical knowledge among a variety of stakeholders and affected interests who have a great deal to lose or win but often little expert knowledge. Thus, the information flow should be interactive, such that those affected understand the consequences of decisions made, and the project organisation understands the consequences of their actions and how they are perceived by those affected (Beneluxlijn). The Netherlands Team also note the importance of determining the

dominant stakeholders' positions, especially in the early planning phase. Once decisions have been made and approval given, less attention is given to other stakeholders.

Hong Kong – interviewees suggest that there should be more community involvement in MUTP planning and delivery and public consultation should be transparent. Engagement should take place at the project conception stage, before alternative options have been considered. The majority of interviewees consider that genuine engagement could provide a platform to identify potential social impacts of MUTPs and help identify the community's common social value and share views in planning and decision-making.

Japan – for both the Metropolitan Expressway and Kyushu Shinkansen residents were viewed as a context specific risk. In the case of the latter, continuous commitment to the project and making the link to economic development in the region were key factors. The risk of public opposition influenced the funding risk because national funding is dependent on regional social consensus. In all three cases, the consensus of the general public was seen as the most influential context in planning and delivery. (Japan Country Summary)

5.2.6.6 Manipulation of belief systems and context

UK case study findings indicate that public and private sector project sponsors/initiators may well be able to mitigate risk by taking advantage of government vision/belief systems (e.g. by negotiating favourable terms for a PFI concession) when context is favourable (e.g. when the PFI/PPP approach is seen as 'the only game in town').

No strong resonance was detected from amongst the international case studies in regard to the above.

5.2.6.7 Need for 'certainty', accuracy and realism

UK case study findings indicate that 'certainty', 'realism' and the ability to enable the proper integration of actions and activities by all concerned parties are seen as important aspects of project planning and implementation plans and programmes *Certainty* is seen as particularly critical in terms of commitments to the delivery of key decisions, approvals and infrastructure components (by a specified time) on which parallel investment and funding decisions are to be based.

No strong resonance was detected from amongst the international case studies in regard to the above.

5.2.6.8 Skills, competencies and relationships

UK case study findings suggest that:

- an important skill for managers and decision-makers is the ability to see projects in their entirety (holistically) over the entire lifecycle;
- personality and personal relationships are vitally important at all levels, within and between organisations. Indeed, MUTP planning and delivery is fundamentally impacted by stakeholder personalities and personal relationships which need to be detected, fully comprehended and monitored over time;
- strong leadership can reduce uncertainty the private sector has a requirement for strong leadership and the certainty that accompanies this;
- a full understanding amongst both public and private sectors of each party's constraints, based on the proper availability of information, is a key requirement for mitigating risk;

- co-operation and relationship building are seen as more fruitful than adversarial relationships. Networking and the establishment of a 'trust environment' are seen as vital by most stakeholders, particularly in regard to overcoming 'silo thinking';
- it is important to maintain consistency of personnel throughout the planning and delivery process so as to maintain mutual understanding of negotiating positions.

Much of the above resonated strongly with international case study findings, although it should be noted that *managerial competence* received rather more attention than in the UK case study findings. Key issues associated with successful management were seen to include:

- the availability of strong political leadership and governmental support, team work and management structure, and effective project planning;
- as much attention needs to be given to management capabilities at the planning and appraisal stage as at the technical implementation stage;
- the need for core skills in negotiation, integrated planning, adapting to uncertainty, building confidence and reputation;
- different management styles may need to be adopted in different contexts 'one size does not fit all' and a keen sense of the impact and importance of 'context' is key.

Institutional competence was also mentioned by a number of Partners. This included the competence of state institutions charged with planning and delivery, some of whom appear to lack adequate experience and the will/capability to 'learn' from previous experiences within countries and elsewhere.

Examples of characteristics associated with managerial competence

Australia – as noted in the context of the Melbourne City Link, competence in decisionmaking for MUTPs is seen as: being associated with the *effective* (rather than merely adequate) treatment of risk, uncertainty and complexity, and sensitivity to context; following from strong political leadership and governmental support, strong team work and management structure, and effective project planning. Managerial competence that was demonstrated in the City Link case study was shown in the ability of team leaders to negotiate outcomes and arrive at compromises satisfactory to all sides thus minimising the need for court action. For the Perth-Mandurah Railway interviewees said more about the political genesis and management of the project than the technical management - in fact in discussions about management the conversation often returned to leadership. However interviewees talked about some of the technical aspects: the integrated planning of the project (including city planning), financial management and planning, the contracts, project planning, and team work and skills. Strong leadership with 'vision' was necessary to get the transport network to work irrespective of the formal bureaucratic structure.

Sweden – in regard to the Oresund Link it was seen that project managers in the implementing organisation (the Oresund consortium) had a good grasp of both the technical complexities of the project and also of its political and social dimensions. They understood and interpreted the political vision behind the project and worked actively to convey this vision to the public.

Netherlands – for the HSL-Zuid project interviewees noted that different leadership styles worked well at different times. In the initial (planning) stages, the leader's consultative approach was beneficial, while immediately prior to approval a new leader was appointed – he "knew how to shift gears in parallel." Thus, one interviewee concluded that: "Perhaps the conclusion is that there is no 'best practice'; you have to develop your own best practice." In regard to both Randstadrail and HSL-Zuid most respondents argued that certainty of knowledge is impossible and a project should be organised in an interactive way so that it

can adapt to unforeseen problems. It is therefore important is to appoint knowledgeable and creative people who can respond to challenges.

Hong Kong – a particularly successful project management strategy for the Airport Railway during the uncertainty before project commencement was the management's ability to retain appointed contractors while the project was on hold. Contractors agreed to honour their original proposed commitments, despite an eleven month delay in commencement – such was the construction industry's faith in MTRCs resolve and ability to see the project through.

Institutional competence

Greece – the Greek Team note the perception that state institutions had limited competence/experience in terms of their ability to deal with RUCs generated by the case study projects. This lack of competence is attributed to the lack of experience and capability to cope with large and complex projects of this kind, and moreover to successfully arrange PPPs with the private sector. The team also note that the degree of competence in decision-making appears also to be determined by the level of communications between key players involved in decision-making processes.

Netherlands – in regard to Randstadrail it was seen that the ability to learn from emerging issues and to act accordingly was extremely relevant. It is therefore suggested that project organisations should be structured around this ability to respond (learn/act) rather than an ideological orientation to a certain structure such as a PPP/PFI.

5.2.6.9 Good and 'best' practice and institutional learning as a means to mitigate risk

UK case study findings suggest that drawing on experience from other projects is seen as a key means to mitigate risk. However, 'best practice' is considered as frequently being contextually insensitive and consequently something which must be applied with great care. Contextually adapted 'best practice' – referred to here as 'good practice' can be applied with greater 'safety' once projects have been effectively 'frozen' – suggesting that this later stage is seen as less subject to changing contextual influences.

International case study findings suggest a widespread lack of evidence of institutional learning, notably as a result of very few examples of post-project evaluation. Some countries have established ex-post evaluation systems (e.g. Japan and France), but the lack of such systems or of an institutional learning culture is seen as a weakness in others (e.g. in Sweden and Greece).

Learning from, and adapting, best practice and drawing on existing knowledge within the implementing organisation were emphasised by a number of Partner findings. Illustrative examples are provided as follows:

Institutional learning

Sweden – interviewees for the Southern Link generally considered the lack of post-project evaluation to be a significant flaw in infrastructure planning in Sweden.

Japan – the Japan Team note that there exists an ex-post evaluation scheme for projects subsidised by national or local government to exploit both positive and negative lessons learned by all stakeholders (though this is mostly from the viewpoint of economic evaluation).

Good and 'best' practice

Netherlands – in the context of the HSL-Zuid case study it is noted that it is not so much the identification and application of best practice that is crucial, but more the ability to learn from such practices (third party monitoring of project progress, upcoming risks, and contextual developments is seen as crucial). The Beneluxlijn project was seen as an example of good practice, which utilised the organisation's previous experience and 'kept things simple' - the project leader deliberately chose not to use new techniques, but knowledge present in the organization. His experience dated from the construction of the first metro line in Rotterdam. These 'best practices' were of course within the same local context – not a transplantation of practices from other institutional and social contexts.

Hong Kong – the Hong Kong Team conclude that institutionalising a standard set of procedures in planning and delivering MUTPs is important, as is for Government to engage independent consultants to review the delivering agent's projected figures, assumptions and financial viability estimates.

5.2.6.10 Innovation and risk, uncertainty and complexity

While this matter was not seen as especially crucial in relation to the UK case studies (except in the case of JLE) considerable mention was made in Partner findings of the impact that innovation may have in relation to RUC. What is most apparent is that the use of innovative technologies and approaches to/systems for project planning and delivery is seen as being particularly context-sensitive – in that in certain contexts innovation is seen as a means to mitigate risk (e.g. in Japan), while in others the use of 'tried and tested' technologies and approaches/systems is considered to be more appropriate in the face of RUC (e.g. Netherlands and USA). What seems most significant here is that the use of innovative technology or approaches/systems should not be undertaken without first having a very clear notion of the context into which it is to be placed and its adaptability to that context.

Figure 5.8, from the sensemaking analysis³¹ of the OMEGA pre-hypothesis data set, shows a significant relationship between project uncertainty circumstances and solutions to unforeseen organisational issues. As project stories feature more uncertainty, solutions (or innovations) to unforeseen organisational issues become more relevant.

The above is illustrated by the following examples drawn from international case study findings:

Netherlands – the Netherlands Team conclude that MUTPs are simply too large and too expensive to be a basis for experimenting with new technologies. The use of technical methods or systems that have not been developed or fully tested is seen to create substantial risk in terms of programme and cost. Hence, innovative systems should be capable of providing a very substantial increase in project quality if it is to be worth the involved (noted in the context of Randstadrail and Beneluxlijn).

Japan – by contrast, for the Oedo Line, the implementing institutions applied the innovative application of smaller cars/smaller tunnel dimensions so as to minimise costs – notably the project promoters were under significant pressure to minimise costs. Thus the Japan Team conclude that proponents might choose uncertainty in relation to technological developments in order to reduce major risks. Indeed, for all three case study projects, the use of new technology created *uncertainty* even after construction started but this was seen as

³¹ Results shown in this section of the report are from a sensemaking analysis of 1787 stories from the 21 OMEGA projects where pre-hypothesis indexed data was supplied. The sample data consists of 1240 Sense Making Items (SMIs) attributed to 'complex projects', and 547 SMIs attributed to 'simple projects'

acceptable because it was a factor that could be decided/controlled internally and because it was seen as a means to mitigate other risks such as public opposition (Metropolitan Expressway).





Axis for Uncertainty Circumstances 0 = Totally certain 100 = Completely uncertain

ORQ#3 - how important is context in making judgements regarding overall research questions 1 and 2?

5.2.7 Key contextual influences

5.2.7.1 Contextual forces influence pivotal decisions

UK case study findings indicate that key contextual influences (temporal, political, cultural, economic etc.) are seen to mould the planning and decision-making processes for many, if not most, MUTPs. Changing contextual elements result in the evolving nature of MUTPs in that the planning and delivery process responds to the moulding influence of changing contextual elements over time.

Key contextual drivers identified in relation to the international case studies (see also the synthesis of the '4 Tests' results earlier in this Volume) included:

- the existence of a clear/self-evident need for a project;
- inter-dependencies between projects one project leads to another;
- the availability of a previously successful (similar) project;
- economic and financial context recession, public sector debt and/or ideological context leading to a determination to adopt the PPP/PFI approach;
- environmental context which may be either highly constraining or favourable;
- stakeholder context the activities of key actors and lobby groups, existence of conflicts between stakeholders and the drive to achieve consensus;

• national, legal and administrative frameworks – including volatile political contexts, national political imperatives and the involvement of multiple institutions.

What is clear from these findings is that while many of the above drivers are somewhat generic in nature, their *combination* at key points throughout the project lifecycle is likely to be highly context-specific.

Need and rationale as key contextual drivers

Australia – the Melbourne City Link project was based on a strong logic of 'clear need'. The anti-motorway sentiment that prevailed following the attempt to introduce a grid of urban freeways in the early 1970s was overcome by a strategy of connecting and enlarging existing freeways. City Link continued that logic. In the case of the Sydney Cross City Tunnel, the apparent success of several other toll way projects in Sydney tempted the Government try to recover all the public sector costs in designing and implementing the project. However, despite this (as noted above), the supporting narrative for the project became fatally confused in the public mind due to the lack of clarity over its principal objectives.

Sweden – regarding the Arlanda Link, interviewees noted that a key reason for the project being implemented was that a rail connection to the airport was stipulated in the permission granted to build a third runway at the airport (it was thus a case of one mega project spawning another).

Economic context

Australia – since Western Australia received royalties from the immense mining industry in that State, it was able to provide finance to build the Perth-Mandurah Railway without having to rely on partnership with the private sector. For the Melbourne City Link the economic downturn in the early 1990s gave added reason for the project under the logic of economic stimulus to get Victoria 'on the move' again. More generally, the on-going concern to reduce public sector debt also played a significant role in regard to two of the Australian case studies (Melbourne City Link and Sydney Cross City Tunnel) since both Victoria and New South Wales governments could claim significant additions to infrastructure without adding much to government borrowing.

Sweden – the context of the early 1990s (economic difficulties in Malmo and Copenhagen) represents an important basis for judgements about the success of the Oresund Link. The role played by the project in boosting the economies of both Malmo and Copenhagen is a recurring theme in interviews and in this respect the increasing commuting from Malmo to Copenhagen and the increasing integration of the housing and labour markets are often put forward as important contextual dimensions to explain its success.

Japan – the energy crisis in 1973 significantly worsened the financial climate forcing the Government to temporarily abandon the Oedo Line project.

Environmental context

Australia – the local environment through which the new section of the Melbourne City Link passed was of little natural environmental value, thus creating a favourable environmental context for the project. By contrast, for the Perth-Mandurah Railway, it is noted that Western Australia is a unique environment. It has very high levels of biodiversity, large numbers of unique species, and fragile water and land resources in many places. This set the context for environmental issues, with sensitivity to such matters being high. Also important was the

linking of the environmental debates with improved public transport and the discourse of land use transport integration (or LUTI).

Sweden – the handling of the effects on the marine environment in the Oresund and the Baltic Sea became a central topic in the controversy surrounding the project.

Archaeological context

Greece – archaeological concerns represented a common contextual source of RUC for the Athens Metro and Attiki Odos projects.

Stakeholder context

Australia – for both the Perth-Mandurah Railway and Sydney Cross City Tunnel it is noted that there was much discussion about the influence of the actors involved and their roles. In regard to the latter it was seen that there was significant conflict over motorway building in Sydney - between the road lobby and those who wanted to see more sustainable environmental outcomes.. The road was meant to resolve the conflict by the improvements to the urban environment of central Sydney. But the conflict was not successfully managed and the environmental improvements were abandoned.

Japan – the Japan Team note that in all three case studies the need to achieve a consensus amongst the general public was seen as the most influential context in the planning and delivery of the projects. For the Metropolitan Expressway, the attitude of the general public had a negative impact in 1968 (due to environmental concerns) and a positive impact in 1990 (due to serious congestion). Kyushu Shinkansen was dependent on national funding, which needed consensus of the general public nationally. For Oedo Line, the support of the Governor of Tokyo Metropolitan Government was seen as important because it was seen as representing the attitude of the general public.

National, legal and administrative frameworks

Sweden – several interviewees for the Oresund Link active in different levels of the regional administrative and political arena stressed the importance of removing barriers to integration between different national legal and administrative frameworks for taxation, social security and health care. In this sense there are clearly contextual factors that directly influence the success of the project since these factors are considered to hinder integration and restrain the growth in traffic volumes across the Link. In regard to the Southern Link interviewees indicated that in many cases great importance was accorded to context. A key example of this is the difficult political situation and the way this led to context-specific responses in terms of handling the RUC associated with the project. The lengthy political disagreement about the development of the transport system in Stockholm, and the controversies surrounding the Dennis agreement is clearly a key contextual aspect. For the Arlanda Link, context was important both because the PPP-model was the first in Sweden and because of the political stages of making a contract between the government and the private party.

Greece – the Greek Team note that, because the three case study projects constituted the first generation of MUTPs to be implemented in Greece (in the last 30 years), the prevailing institutional and economic context exposed them to serious RUC.

Hong Kong – the Airport Railway and Western Harbour Crossing were both part of the 10 Airport Core Projects planned to boost public confidence, to create employment and generate economic activity. The transition of Hong Kong as a British colony to a Special
Administrative Region under China created a lot of uncertainties when a number of major projects were planned, appraised and built. The political context also led to a one-year delay when China and Britain debated on the financing mode of the Airport Railway.

5.2.7.2 Perception of/responses to 'context'

UK case study interviewees suggest there are different professional perspectives on the influence/importance of context - planners/politicians are seen as more contextually aware than 'traditional' project managers driven by day-to-day aspects of project delivery according to rigidly interpreted programmes. Moreover, the 'project delivery phase' is seen as less contextually sensitive than other phases because of the perception that the project is 'frozen'.

In regard to the international case studies no explicit resonance was detected for the above.

However, it is apparent from Partner findings that there is a general presumption that context perception is critical in MUTP planning and delivery, although some note that discerning contextual change is very difficult. Equally, it is suggested that MUTPs which respond appropriately to changing contexts are more likely to be judged 'successful'. However, no distinct resonance was detected in regard to differences in context perception between professions/disciplines.

Influences such as the ideological positions of stakeholders, the occurrence of tipping/turning points at critical junctures (e.g. related infrastructure investments) were seen to help create the momentum to progress projects. It is also suggested that responses to context can *create* critical tipping/turning points which play a crucial role in helping projects to move forward and that responses to unfavourable contexts can seized as opportunities to maintain momentum.

The summary of international findings is exemplified by the following.

Context perception

Greece – case study findings indicate that in order to really appreciate and address RUC factors (and the notion of 'success') it is essential to appreciate the cultural, political, historical and institutional realities of societies that pursue the construction of mega projects (not only MUTPs).

France – the French Team conclude that contextual change often challenges existing institutional arrangements and decision-making processes. More specifically, context impacts on the capacity of the public sector to break with the traditional organisational structures by sharing the management of projects.

Sweden – concerning the Southern Link, interviewees appeared to base their opinions of the project on ideologically influenced views concerning the environment, economic growth and motoring as societal phenomena. It could be argued that there is also a universal dimension to the judgements on success and the handling of risk, uncertainty and complexity that in some respect is disconnected from context. This was for instance exemplified by one interviewee representing a political party explaining that the party is opposed to investments in road projects since they view this as incompatible with goals of reducing climate change.

Responding to context

France – findings in relation to (notably) the Millau Bridge project indicate that if a MUTP is undertaken as an incremental process, one of the factors of success is the awareness of context. In particular, it is seen that three main decisions represent turning points for the development of the project: firstly, was the choice by the Public administration (Direction des routes, Jean Berthier) of the "solution haute" which was the most technically risky decision. Key actors accepted the RUC involved because they were very confident of their skills and competencies; secondly, the decision to conduct a consultation during feasibility studies with a large board of architects and civil engineering offices, outside of the administration which encouraged external input; thirdly, because of budget constraints, the decision to undertake the project as a concession instead of a publicly-constructed project. This opened-up the project to other private sector stakeholders. The main point here is that every turning point played a role in helping the project to succeed in terms of meeting its cost, programme and specification objectives.

Australia – institutionally the Perth-Mandurah Rail project established a momentum. In terms of the theory of path dependence, retaining the Fremantle line and building the Northern Suburbs railway appears to have been a turning point, or 'critical juncture', and the momentum continued with the construction of the Mandurah line. This turning point appears to represent a permanent shift in public investments towards a greater, but not exclusive, emphasis on railway building.

Greece – it is suggested that 'context' is so complex (in terms of its many and ever-changing components) that it is impossible to really take it fully into account. In regard to the Athens Metro, most interviewees considered that context was taken into account in making judgements (and decisions) on key planning issues - additionally, most interviewees considered that decisions were adapted to the Greek context.

Japan – all of the case study projects experienced a temporary freeze due to unfavourable contexts such as objections from the general public who were concerned about the environment, financial difficulties experienced by Japan National Railways, and the energy crisis that worsened the economic climate. However, even during these 'frozen periods' the stakeholders engaged in project implementation continuously and took action to start construction. Interestingly, all of the actions resulted in important steps in the implementation of the projects.

5.2.7.3 The need for context scanning

For the UK case studies it was seen that continuous monitoring of contextual change enables strategies, plans and programmes to be adjusted in light of early warnings of the need for corrective action resulting from such monitoring, and procedures can be established to ensure that such monitoring takes. That said, there is rarely evidence to suggest that there are *explicit* mechanisms and procedures for identifying and monitoring contextual forces. However, the many references to relationship and consensus-building on the part of key decision-makers suggest a considerable degree of 'informal' context awareness and scanning.

No significant explicit resonance was detected amongst the international case study findings in relation to the above.

5.2.7.4 Political influence/support as a key contextual element

UK case study findings suggest that political influence/support is seen as *the* critical contextual factor in all aspects of planning and delivery and a clear pre-requisite to the

successful launch of a project. This is seen as rather inevitable given that such MUTPs are usually costly, require some form of government backing, are potentially controversial and have wide ranging impacts over a broad area.

The availability of an influential champion is also seen as a key asset for MUTP project sponsors, planners and delivery agents - especially those complex agent of change MUTPs that are dependent upon some form of vision requiring faith and belief. Project guardians can provide additional support for champions, playing an important role in maintaining progress during times of adversity – e.g. during the project implementation stage of JLE, support from John Prescott (Deputy Prime Minister) as project guardian was critical. However, political champions were not seen as necessary for relatively simple projects.

Other aspects of political context that were seen as critical include:

- the tendency towards 'short-termism' on the part of politicians and civil servants (which suggests both an inability and lack of desire to effectively scan existing and future context – rather, the focus is on defining what is practical and achievable in the short run);
- the use of MUTPs as political tools (e.g. the CTRL-Thames Gateway vision was seen as a means to promote political agendas);
- the positioning of CTRL as a means to promote regional restructuring, growth and regeneration required both considerable faith and strong advocacy skills amongst key political decision makers, and;
- consensus-building amongst key political and other influential decision-makers is seen as a critically important contextual matter, especially at the project conception, planning and appraisal stages - i.e. before the project has gathered sufficient 'momentum' to have a life of its own. Consensus-building requires 'trust' and strong lobbying skills.

International case study findings confirm that political influence/support represents a key contextual element in MUTP planning, appraisal and delivery. In particular, strong political leadership and the ability/willingness of project champions to step forward at critical junctures was cited as crucial factors in the apparent 'success' in a number of case studies: in one of these, support was not forthcoming initially but emerged later; in another strong political leadership was specifically for the use of the PPP mechanism. Two further case studies cited the variability of political support (in one, it was ineffectual during the operations phase, and in another it was complicated by support for competing modes). Conversely, a lack of consistent political leadership was associated with one project that has been seen as somewhat unsuccessful. The unpredictable nature of political intervention (e.g. for electioneering purposes) was seen as a source of uncertainty in Greece. Finally, the locational distribution of opportunities and benefits associated with MUTPs was seen as a way of bringing political influence to bear in cases such as the TGV-Med, Kyushu Shinkansen and Perth-Mandurah Railway.

These summary findings are illustrated by the following cases.

Political context and leadership

Australia – for Melbourne City Link it is clear that strong political leadership was critically important to the project's successful implementation in terms of its internal objectives. It is significant that benefit-cost analysis was only carried out after the decision to proceed. Once that decision was taken the possibility of abandoning the project was removed. There were moments of adamantine firmness on the part of the Premier (chief minister of the State of Victoria) in dealing with the bidders for the concession, as evidenced in the stories told, but there is also evidence that flexibility was later shown in dealing with conflicts over the contract, and innovative thinking attentive to public needs about mitigation of negative social effects and in the design of the tolling system. Similarly, for the Perth-Mandurah Railway

there was strong emphasis in interviews on the role of political leadership, with its connotations of power, success, and reputations on the line. Political leadership was linked strong and consistent supporting narratives.

Project champions

Australia - many Perth-Mandurah Railway interviewees mentioned the critical role of the Minister and the top leadership in promoting and 'championing' the project. The Minister adopted a consensus-building style, but was prepared to take strong action and be very firm when the occasion demanded.

The nature of political support

Australia – in contrast with both Melbourne City Link and the Perth-Mandurah Railway, the Sydney Cross City Tunnel was not given undivided and unequivocal political support and there was reportedly conflict and rivalry between Ministers.

Japan – for the Oedo Line, the political aspect of the city planning guidelines that promoted the shift to a multi-centre urban structure supported the project and necessitated coordination with urban development projects. It was also noted that political support for public funding was threatened by cost escalation during construction of the Oedo Line. When the soaring cost was argued during the construction works, the then current Governor Ishihara said: "I thought we bought a Corolla, but it was a Benz.". The implementing institutions tried to invite him to the construction site, expecting him to change his mind. Finally he visited the site, changed his attitude and decided to bear the additional cost. The support of the Governor and his decision to bear the additional cost maintained project progress.

Sweden – the change of government in the 1991 general elections was another very important contextual aspect mentioned by virtually all Arlanda Link interviewees. The government in power from 1991 to 1994 was ideologically committed to deregulation and privatisation. As such, the implementation of the Arlanda Rail Link as a PPP project was driven by political aspirations in addition to the wish to improve the transport system.

Hong Kong – political support was seen to characterise the whole planning and delivery process for the Western Harbour Crossing. However, during the operations phase the project experienced significant problems (low patronage levels) but at this stage, the Government seems to have been unable to take mitigating action. Another key political factor cited was, at the time of tendering and negotiating the BOT agreement in 1992-3, the perceived risk that there might be problems in finding private sector partners willing to accept the risk of a 30-year contract to build and operate such a capital intensive project which was to straddle the return of sovereignty of Hong Kong to China. In regard to West Rail, the operation and financial viability of the project was seriously affected by political influence - District councillors, in trying to secure votes, fought to protect other local transport modes such as buses and minibuses.

Political intervention and uncertainty

Greece – Greek Partners note that political intervention which is endemic in Greece, results in uncertainty as much is dependent upon the nature of the political decision-making process and individual politicians – many of whom are seen to be unpredictable as a result of electioneering and the pursuit of personal agendas.

Politics of the distribution of opportunities/benefits

Australia – the politics of the distribution of transport opportunities was seen to be a significant factor from the start of the Perth-Mandurah Railway. Once the Northern Suburbs line had been built, there was concern about the suburbs sprawling along the Perth coastline to the South of the CBD. Initial examinations were seen to be no more than a rhetorical sop but later it was perceived by the government and Perth City Council, that the people of the South West were significant to the economy of the whole city.

Japan – in the context of the Kyushu Shinkansen project it is noted that Kyushu is geographically far from Tokyo Metropolitan Area, which might be directly or indirectly a disadvantage - directly, it might lead to less support from national government at earlier stages, indirectly, it might generate different levels of commitment among Prefectures and municipalities because the distribution of benefits was unlikely to be even and because vertical (national-local) relationships might be more important than horizontal (local-local) relationships.

5.2.7.5 Mega events as contextual influences

UK case study findings indicate that 'mega events' can have a high impact on MUTPs. These may have both a positive and negative impact on MUTP planning and delivery - fixed deadlines associated with MEs 'focus the mind' and help reduce risk. However the downside is seen in terms of the diversion of attention, oversight and resources away from other important projects, thus increasing risk.

Mega events in both Greece (Olympics) and Hong Kong (the Handover to China in 1997) were seen to have had a pivotal impact on MUTP planning, appraisal and delivery, as explained below:

Hong Kong – the 1997 Handover to China influenced both the rationale for the Western Harbour Crossing and the desire to implement it speedily. In the case of the Airport Railway this same mega event (as noted above) had a negative impact as negotiations between Britain and China on the financing mode effectively delayed the project for one year.

Greece – the Athens Metro was fundamental to Greece's bid for the Olympic Games. In the context of the Olympic bid the case was made for major interventions into the Athens transport infrastructure - a constituent part of which was the building of a metro system (which had already started being built in 1992. The Community Support Framework and the Olympics played an important role in putting on track several big projects in Greece. Interviewees suggest that the Olympics accelerated the time schedule and the process, created a collective vision, achieved co-ordination and ultimately the benefit outweighed the cost. In this sense, the Olympics had a positive impact.

ORH#1 – Traditional criteria relating to cost overruns, completion dates, generation of travel time savings for users and rates of returns to investors are inadequate measures of success in the 21st Century as sustainable development concerns become increasingly critical both globally and locally.

5.2.8 Closed v open system approaches

5.2.8.1 Projects may be treated as both open and closed at different times, and for different reasons

UK case study findings suggest that MUTPs may be treated as both 'open' and 'closed' at different stages, and for different reasons:

- they may be treated as closed systems for economic appraisal/financial (demand) modelling and business case assembly;
- they may be treated as open systems (often subsequently) in terms of accommodating broader elements that become ultimately a major part of the justification of the project.

A closed system approach is seen as more justifiable (by interviewees) for those projects that are:

- relatively simple or straightforward; and
- subject to the PFI mechanism where financial imperatives tend to overshadow most other concerns.

By contrast, it is suggested that more complex projects with wider 'agent of change' /agglomeration objectives and associated plans/programmes need to be treated as fully open during the planning and appraisal process so as to allow for the playing out of stakeholder agendas and other contextual forces.

As for the UK case studies, international findings suggest that MUTPs may be treated as both open and closed at different stages in their lifecycle (and for different reasons). In the main the degree of 'openness' is seen in terms of the willingness of project planning and delivery agents to respond to stakeholder input.

Partner findings also supplement the above UK case study findings in highlighting other characteristics of open and closed system approaches. They may, for example, be treated as open systems when there is a clear need to respond to contextual change brought about by such influences as public opposition - during the initial design stage (in particular), an open system approach can be positively beneficial in terms of addressing/incorporating different stakeholder needs and wants, although it is acknowledged that the processes that accompany this may be very difficult to control. A closed system approach may sometimes be adopted when a MUTP is thought to require 'protection' from external influences that might otherwise seek to change the project scope in the face of tight budgetary conditions.

These points are illustrated as follows:

France – Millau Bridge moved from a closed to an open system as a result of two main movements: increasing public sensitivity to sustainability issues; globalisation, in particular through the impact of EU regulation regarding open competition.

Japan – both the Metropolitan Expressway and Oedo Line projects were initially treated as a closed systems but were subsequently 'opened-up in order to respond to public opinion and objections.

Netherlands – it is noted that Beneluxlijn was treated as a closed system by project managers so as to protect it from external influences, such as requests for additional tunnelling, in light of the need to adhere to its lump sum budget. In the context of the HSL-Zuid case study project the Netherlands Team conclude that MUTPs represent a balancing act between inclusion and exclusion of stakeholders and their interests. There are seen to be two strategies for this: one tries to incorporate such interests into the project design and allows it to be inspired by the input of the many different actors; the other is to try to protect the project against external influences. The first accepts that an open system, where one cannot control all factors, can be a great source of creativity. The other, more common, approach treats the project as a closed system that needs to be typical of situations where the project enters the decision-making arena as a 'solution' rather than as a broad search for a solution to a problem.

Hong Kong – the Hong Team conclude that the Western harbour Crossing project was treated as 'closed' to agglomeration objectives, and that this was a major lost opportunity – the project's development was not planned with wider objectives tin mind that might have enhanced its attractiveness (it could have facilitated the redevelopment of nearby urban areas).

5.2.8.2 Open/closed system approaches and different MUTP types

UK case study findings suggest that: a closed system approach is seen as more justifiable for those projects that are: relatively simple/straightforward, and; subject to the PFI mechanism where financial imperatives tend to overshadow most other concerns, and; more complex projects with wider 'agent of change' /agglomeration objectives and associated plans/programmes need to be treated as fully open during the planning and appraisal process so as to allow for the playing out of stakeholder agendas and other contextual forces.

No significant explicit resonance was detected amongst the international case study findings in relation to the above.

5.2.9 Politics

5.2.9.1 Political will/ influence

UK case study findings suggest that:

- political will, imperative and pragmatism frequently override outputs from appraisal methodologies that apply 'traditional' tools, methods and criteria. Indeed, judgement and gut feeling are seen to be as significant in determining whether (and in what form) a project should proceed as more formal appraisal methods;
- most key decisions that shape projects are taken at the highest political level due to their prevailing cost, size, complexity and impact characteristics (and also concerns about national prestige). Such decisions are taken only after substantial political manoeuvring and consensus building to ensure that projects achieve sufficient momentum;
- for PPP/PFI projects, financial considerations appear to override many other criteria such projects cannot be seen to fail as far as government is concerned.

No significant explicit resonance was detected amongst the international case study findings in relation to the above. Instead, Partner findings for the Netherlands and Hong Kong focused more on (respectively): whether there is a need for national agency guidance when the prevailing trend is towards decentralised governance (seen as particularly beneficial in terms of the availability of local knowledge); policy paralysis in the operations stage of the Western Harbour Crossing which failed to address the project's inability to resolve congestion problems.

5.2.10 MUTP appraisal approaches and techniques

5.2.10.1 Appraisal processes and criteria

For all three UK case studies it is acknowledged by interviewees that traditional criteria associated with (especially) time, cost, value for money and quality remain of critical importance - particularly when such criteria are embodied in a project's fundamental objectives. Broader criteria such as the fostering of economic growth, sustainable development, environmental concerns and other 'social' matters in appraising MUTP achievements are of critical importance. However, such matters are seen to be: rather difficult to operationalise and 'measure' successfully using 'traditional' methods, and; the responsibility of agencies (primarily government) which are perceived to be outside the project delivery process. In addition, in the UK Sustainable Development Visions are not presently seen as a suitable framework for judging the success or otherwise of MUTPs due to perceived difficulties in defining 'sustainability' in an operationally assessable manner.

Despite the above, current (UK) project appraisal and evaluation tools, methods and processes (especially the manner in which they are utilised), are perceived to be flawed by 50% of UK interviewees. Therefore, dependence upon these tools, methods and processes alone is unlikely to deliver a successful MUTP.

Key issues/problems associated with the current appraisal and evaluation 'toolbox' are:

- the inability to identify, quantify and 'weight' all relevant factors that determine/influence project outcomes with any real degree of precision;
- perceived bias towards the achievement of short-term benefits (which is problematical for MUTPs which are characterized by long-term impacts;
- the lack of attention to future contextual elements/conditions likely to impact on project outcomes - not least because many of these contextual influences are extremely difficult to discern and are subject to change over time;
- as noted above, political influence frequently overrides outputs from traditional methods and processes;
- the perception that decision-makers are often told 'what they want to hear' in terms of model outputs that purport to represent project achievements;
- the shortcomings associated with the current toolbox are not adequately explained to decision-makers;
- the inconsistent treatment, mainly by sponsors/proponents of MUTPs as projects that are both 'open and closed systems' and as both 'commodities and services' at different stages in their lifecycle.

Notwithstanding the above, interviewees emphasised the need to enhance current tools, techniques and processes rather than abandon them - by, for example, making use of a wider multi criteria approach that takes full account of future contextual conditions.

The shortcomings of current project appraisal and evaluation tools, methods and processes (including the manner in which they are utilised) are frequently not fully understood by those who most often make use of them in the UK context. It is believed that there is consequently a professional reluctance to acknowledge such shortcomings, except insofar as these can be improved upon by employing ever more 'sophisticated' techniques and enhancements. In parallel, there is perceived to be a need to 'place' techniques such as CBA and traffic modelling into a broader decision-making framework that enables their strengths and

weaknesses to be taken fully into account - and weighted in accordance with different stakeholder perspectives.

In the international context traditional appraisal methods are similarly seen as unable to take due account of all (contextual) variables and must therefore be treated with caution – especially in light of the changing nature of such variables over time. Current international practice tends to focus on relatively narrow functional and technical criteria, not least of which is financial returns - even though these do not always ultimately determine the final decision outcome (e.g. if political imperatives override them). However, it is also acknowledged that appraisal criteria associated with the 'iron triangle' of time/cost/quality remain cornerstones of current approaches and do have value. The consensus thus appears to favour ensuring that such criteria are contained within a broader framework that is able to address the short, medium and long-term impacts of MUTPs – albeit that determining the 'boundaries' to which such a framework should apply is extremely difficult.

In some eight case studies traditional appraisal processes/criteria are seen as inadequate - partly as a result of the fact that forecasts ultimately proved to be inaccurate, partly because unfavourable cost-benefit analyses were largely disregarded when the project was seen as politically necessary, but more commonly because these processes do not take into account wider impacts such as urban development. The international case study findings also suggest that sustainability criteria should supplement traditional criteria, rather than replace them – see also ORH#3 below.

The following examples highlight these findings in more detail.

Issues associated with traditional project appraisal criteria

France – against the background of their three case studies the French Team concur that 'traditional' methods/approaches remain weak and must be treated with caution since they rarely take full account of such matters as environmental impact, the implications for urban development, increasing project complexity, long-term operating costs and the lack of information concerning the impact of service quality on resources (e.g. forecast patronage on the RER D was not achieved due to the irregularity of the service but it had been expected to achieve greater profitability than either Eole and Meteor – while it is actually The French Team also addressed the question of the value of cost-benefit worse). analyses. They note that one interviewee commented: "The cost-benefit analysis is very useful, even if it doesn't have to be exclusive for other approaches like the multi criteria one. In general we value gains and losses in the following fields: time of the course, noise, pollution, CO2, insecurity. But there are other subjects for which the monetary valuation is not done: cost cutting effects, for instance . Based on rationales of collective surplus and general interest, these appraisals don't succeed to integrate social and territorial dimensions. Who does win? Who does lose?. That is the main problem in scientific terms. And in more political terms, their main problem is that neither the population nor the elected representatives believe in them."

Sweden – the Swedish Team note the need to examine the wider effects of projects, not the least the long-term effects (in the case of Oresund Link regional integration and the environment). In this connection they suggest that perhaps it is also relevant to reflect on the definition of the concept of success. The more traditional criteria seem to imply that success is a fixed state that can be determined by assessing project performance against estimates made before implementation. It is also interesting to note that the Southern Link was implemented despite the project being subject to two separate Cost-Benefit-Analyses showing it to have a negative cost-benefit ratio. Information from the interviews and other sources indicates that several proponents of the Southern Link argue the tools available to measure traditional criteria (notably CBA) are inadequate for properly measuring the benefits

of projects of this magnitude. A central part of the critique concerns the inadequacy of existing CBA models to capture all the benefits of a motorway tunnels in a densely populated urban area - especially the inability to capture the long-term dynamic (economic) effects of new development made possible by transferring traffic underground. Thus, traditional criteria need to be complemented with other criteria – in the case of the Arlanda Link important additional criteria are the quality of the framework contract, the respective roles and responsibilities of private and public parties, the effects on travel habits in different user groups and the effects on the environment.

Hong Kong - the Airport Railway project was appraised using conventional financial criteria as a stand-alone project and not for its extensive potential positive urban impact (as were the other two Hong Kong case study projects). However, conventional appraisal turned out to be inadequate, as patronage assumptions turned out to be wrong, and the pricing policy was undermined partly as a consequence of political decisions affecting road transport competition. It is also clear from interviews that these 'traditional appraisal and evaluation criteria are increasingly viewed as single naive measures expressed in (financial) terms which are easy to present and understand. Opinions are emerging which clearly understand that traditional methods present a simplistic, often distorted view of reality, and that: ".....reality actually is a lot more complicated". It would also seem that the development of appropriate appraisal and evaluation methods for MUTPs (and mega projects in general) has become an important political issue, and is seen increasingly not as a technical issue. Separation of Airport Railway from its parent airport project and its initial conception as a stand-alone project with operational performance targets similar to that of a private sector project, suggests a 'privatisation at all costs' logic, and the belief that 'all things done the private sector way is best'. This led to private sector-inspired appraisal approaches that did not take into account the impacts of the property and urban developments at station precincts on the wider urban fabric of Hong Kong. Thus whilst the Airport Railway may underperform financially, its second and third order impacts on Hong Kong may indeed be a significant net positive result.

Sustainability issues – relationship with traditional project appraisal criteria

Netherlands – The Netherlands Team note that interviewee responses suggest that sustainability issues are becoming more important but are unlikely to push other criteria into the background - traditional criteria are still perceived as important in determining whether a project is a success (particularly in terms of patronage). Respondents suggest a project can have substantial cost and programme overruns, contribute very little to a sustainable future and still be seen as successful if people appreciate the project and use it. This leads to the notion that quality and usability is the prime concern – in time, programme and cost overruns will have been forgotten.

Sweden – in the context of the Oresund Link interviewee response suggest that (as in the Netherlands) the increasing importance awarded to sustainable development concerns (however that may be defined) does not imply that traditional criteria have lost their relevance. Hence, a common opinion among respondents was that traditional criteria need to be complemented by sustainability criteria to arrive at an adequate measure of success.

ORH#2 – The new emerging international and local agenda related to vision(s) of sustainable development is multi-dimensional and goes beyond notions of environmental sustainability, as critical as this may be, in that it also concerns interrelated concepts of economic sustainability, social sustainability and institutional sustainability.

5.2.10.2 Role of 'sustainability' in MUTP planning, appraisal and delivery

UK case study findings indicate that:

- operationalising SDVs in a meaningful way is extremely difficult, and certainly not yet sufficiently developed to enable them to be applied effectively to MUTPs in the UK so as to influence day-to-day decision-making;
- professional silos and currently entrenched project management thinking often represent effective barriers to the introduction of a more holistic view of SDVs as a framework for project planning, appraisal and delivery;
- the multi-dimensional nature of 'sustainability' demands an holistic view of the complexities associated with MUTPs and the developments/initiatives with which they are associated;
- the relationship between MUTPs such as CTRL/JLE and 'sustainability' is seen more in terms of the delivery of regeneration benefits at development hubs than in relation to the rail/metro services themselves;
- sustainability appraisals were seen as playing a key part in the initial project conception, planning and appraisal process: to determine the need and justification for the project, and; to determine alignments, associated developments and technical specifications etc. that will enhance the sustainability profile of the project and the areas on which it impacts;
- most importantly, such appraisals were seen as being potentially more than a means to appraise the performance of different pre-determined options;
- unless carefully planned as part of an overall framework, within which SDVs are the central focus, MUTPs may simply facilitate ever more travel, both long distance and commuting which is in itself unsustainable;
- the range of appraisal criteria emphasising 'sustainability' is perceived as being too narrow. With this in mind, it is it is suggested that SDV frameworks for MUTPs need to be: clear, consistent and applicable to all parties in MUTP planning and delivery (making clear all respective roles and responsibilities); capable of being operationalised by MUTP planning and delivery agents so as to influence decision-making more directly; supported by a sustainable institutional framework (it is questionable whether SDVs can expect to be delivered in the absence of institutions with well developed 'institutional memory') in light of the fact that they require long-term evaluation cycles.

International case study findings similarly indicate that sustainability visions and objectives with multiple dimensions *should* clearly be important in MUTP planning and delivery but these lack sufficient clarity in practice as operational guidelines or appraisal criteria. Against this background it can be observed from Partner's findings that:

- 'sustainability' is held to mean many different things to many different types of stakeholder – some focus on environmental sustainability as the key concern while others view economic sustainability as paramount. What seems clear here is that few stakeholders are aware that there may be different dimensions of sustainability concerns and there is thus very limited attention given to social and institutional sustainability as being significant in MUTP planning, appraisal and delivery;
- there needs to be a convincing sustainability 'narrative' that can be used to link a MUTP and its specific internal objectives to wider (sustainability-related) visions and values;

- in practice, appropriate and meaningful (to key stakeholders) sustainability benchmarks are rarely established - often despite the rhetoric that accompanies MUTP planning and delivery – to enable project outcomes to be properly forecast, appraised and evaluated;
- there are few (if any) instances where a truly holistic (or 'joined-up') approach to the different dimensions of sustainability was adopted in relation to the case study MUTPs, either at the project conception stage or subsequently;
- indeed, it is seen that conflicts frequently exist between the different dimensions of sustainability in terms of priorities for action – and seemingly little action is taken to resolve such conflicts. In a number of cases there was seen to be a further type of conflict between 'global' sustainability concerns (such as climate change) and more local, pragmatic needs;
- this may, at least in part, be a reflection of the political, organisational and professional silos that appear to remain firmly in place.

These summary findings are exemplified by the following highlights drawn from case study and Country Summary reports.

Australia - the Australian Team conclude that in all their case studies the rhetoric of sustainability was not matched by any capacity or desire to set specific benchmarks or targets against which either the projected or the actual performance could be measured. The team also note that sustainability was held to mean many different things by people involved at the core of the Melbourne City Link project - long term planning of broad scope; the global and local environments; guality of life for the public; externalities; sustaining the economy and 'financial' sustainability; creating a better road network and saving travel time. However, for the Perth-Mandurah Railway the focus came down to three core aspects -'sustainability' in the broad economic sense of enhancing social welfare or benefit, an environmental sense of protecting the global commons (the atmosphere, climate and resource base), and a social sense of contributing to fairness, or social justice. Similarly, there were many different interpretations of sustainability in regard to the Sydney Cross City Tunnel (including 'accessibility'). Thus, it may be concluded that having this many interpretations, generally with no operational definition with which the achievement of targets could actually be measured, meant that 'sustainability' became a rather meaningless concept.

The Australian team also note that, if economic, social and environmental goals are part of the paradigm of sustainability, there remains the question of which should have priority if, in particular cases, they are in conflict. Yet the conflicts emerge in the projects themselves. An important finding from the case studies was therefore that if sustainability is to be a meaningful concept to guide investment in infrastructure projects, the concept must be given much greater precision by confronting internal conflicts, making decisions about priorities, and setting benchmarks and targets based on these priorities.

It is also seen as important to acknowledge the role of sustainability narrative as vision which was a feature of both the Perth-Mandurah Railway and Melbourne City Link. In the case of Pert-Mandurah Railway, even though this narrative was far from clear or consistent, this narrative linked improvement to public transport, and especially electric rail-based public transport with values such as global environmental sustainability, preserving the quality of local environments, fairness and equity in providing transport services to the community, sustaining economic growth in the long term, improving the quality of the urban environment, and improving the transport service. However, such narrative needs to be supported by fact - people need to be told why a project is a good idea.

Japan – conflicts between sustainability dimensions were recognised in that national government tends to allocate funds evenly among possible projects from the social

sustainability viewpoint, which might disadvantage projects whose contributions to economic sustainability are higher. The team also suggest that the (lack of) treatment of conflicting aspects of multi-dimensional sustainability visions is likely to remain.

Notwithstanding the above, the Japan Team conclude that 'traditional' appraisal criteria should be extended to cover other sustainability dimensions - for example, social sustainability (seen as having a great deal to do with reaching consensus with residents and spreading economic benefits), environmental sustainability and institutional sustainability.

Greece – it is widely acknowledged by interviewees that sustainable development concerns have to be taken into account in project planning and appraisal. However, they rarely include the term 'sustainability' in their responses to the initial 'what is success?' question. Moreover, it seems that either the notion of sustainable development is not entirely clear to the respondents or it is such a flexible catch-all term that it is open to multiple interpretations. For example, Attiki Odos is judged by some respondents to be sustainable because it has contributed (temporarily) to the lessening of congestion in central Athens (despite the urban sprawl effect and the overall increase in car-use in the Attiki region). The Athens Metro is regarded as sustainable 'by default' because it is part of the public transport system. Rion Antirion Bridge is regarded as sustainable for lessening congestion in the ports of Rion and Antirion. The Greek Team consequently conclude that sustainability cannot be used as a measure of success or driver of planning decisions so long as its interpretation remains un clear/flexible to different stakeholders.

Interviewee responses also revealed the fact that in the Greek context the various dimensions of sustainability were not fully appreciated - many were unfamiliar with dimensions other than eco-sustainability (which is seen as the primary focus). The impression created from these responses is that, in order of priority, of the remaining dimensions of sustainability the economic dimension is seen as most important, followed by the social dimension and lastly the institutional dimension. Based on the three case studies it is seen that most interviewees perceive economic sustainability as closely related to economic viability, social sustainability as related to quality of life and to the fulfilment of social needs (but very few implied social equity, or the role of MUTPs in society), and institutional sustainability as an effort to maintain a good modus operandi (or to maintain a good quality of personnel in the future and protect the institution from inappropriate political intervention), or as the existence of institutions to effectively produce and enforce development control and implement a proper planning regime.

USA – Alameda Corridor interviewees remarked on the relative novelty of the notion of sustainability as one of the main considerations of MUTP development. Though they mark sustainability as an important concept, they emphasize that it only gained significant momentum after the planning and implementation of Alameda Corridor (a common point amongst all case study projects).

Each of the three case studies were subject to state and federal legal requirements that their planning include the preparation of an Environmental Impact Statement (EIS), and that harmful environmental impacts be subject to appropriate mitigation efforts as part of the plan. The experiences with these EIS requirements point to three generalizations about the ways in which sustainability criteria are addressed in U.S. megaprojects: the EIS criteria do not directly include greenhouse gas emissions, notably CO2, and contemporary concerns for global warming; the EIS requirements and procedures were effective in identifying and mitigating many conventionally defined adverse environmental impacts, and; the Big Dig project illustrated one shortcoming with current environmental review procedures that may be of broad concern – monitoring and enforcement of mitigation commitments made in the planning stage can be lax in subsequent years.

Hong Kong – the team acknowledge that there was no vision or set of values about sustainability/ sustainable development, or how this could be achieved when the Western Harbour Crossing was first conceived - both in terms of local and global concerns (such as climate change). They also note that there are significant problems in operationalising sustainable development guidance despite the fact that the HK Government now requires the assessment of some twenty indicators measuring social, economic, environment, political and other project impacts prior to obtaining project approval. What is absent, however, is how these factors are interrelated, and how they affect the sustainability of organisations and society. This lack of joined-up thinking would seem to be a product (at least partly) by the compartmentalisation of government decision-making and planning mechanisms into silos which means that integrated thinking is still not a norm in the context of Hong Kong.

Netherlands – the three Netherlands case study projects were largely framed as pieces of transport infrastructure and, as result, other appraisal frameworks associated with sustainability/sustainable development were neglected. In the context of HSL-Zuid most interviewees considered sustainability as building something that will last for a hundred years. The team also conclude that environmental sustainability is probably the least considered of the four OMEGA dimensions.

Sweden – the three case study projects confirm that sustainability is seen as a 'fuzzy' concept that can be interpreted differently by different actors. One contrast (clearest in the Southern Link) was that between a focus on local versus global issues of sustainability. From a local point of view the Southern Link might be regarded as a success since it contributed to alleviating pollution, noise and congestion problems in the city centre (although critics would say that it is not successful from this point of view either) and the area where it was built. From a global point of view it is much more problematic since it contributes to an increase in car traffic and CO2 emissions. Interviewees note that if sustainability concerns are to enter into project planning and appraisal there is a need to find ways to make such concerns more specific in nature. In this regard it is also noted that environmental concerns generally take precedence in practice - the main feature of the emerging sustainability agenda is the increasing importance awarded to environmental concerns. In the three case study projects (especially the Oresund Link and the Southern Link), environmental concerns were not at the core of planning from the start but later became a major concern partly because of pressure from external stakeholders. The reading of the concept of sustainability as discussed by interviewees implies that the emerging sustainability agenda incorporates the environmental dimension as well as more traditional economic and social concerns.

5.2.10.3 MUTPs and retrofitting

In the UK context it is seen that, despite the acknowledged evolutionary nature of many MUTPs, there is little apparent current thinking or debate as to how such projects might be better retrofitted so as to meet the needs/requirements of the 21stC - especially in relation to SDVs.

While there were few explicit examples in relation to this matter it does seem clear that international case study findings confirm that retrofitting was hardly considered in relation in the past, and receives little attention today. Other than this general point, there are no notable common threads amongst Partner findings:

Australia – in the case of Melbourne City Link one interviewee noted that it is not possible to retrofit sustainable objectives into an existing project: 'In the case of City Link, no opportunity has been identified to enhance the "sustainability" of outcomes'. For the Sydney Cross City Tunnel, interviewees noted that the possibility of realising the vision for William St had not

vanished completely - the fact that the tunnel enables traffic to bypass the centre of the city could be used in future to justify such measures as restricting vehicle access to the CBD, or a congestion charge on city streets. That said, it was noted that PPP contracts can be a serious impediment to any retrofitting strategy, because contracts would have to be renegotiated.

Hong Kong – the possibility to introduce 'retrofit' strategies drew mixed responses from interviewees. With the airport Railway it was clear that there was a difference between technological retrofitting and institutional or social retrofitting - technological retrofitting to make it operationally more efficient; social/institutional retrofitting to effect a regulatory or institutional change such as a buy-back of WHCTL and reorganisation of its operation so that the three cross-harbour tunnels are collectively managed in order to achieve the best outcomes for road traffic management in Hong Kong. Technical retrofitting is possible as long as the service remains in demand – but there are limits (sometimes the equipment is too old or inappropriate and wholesale replacement / rebuilding / redesign is necessary). Social impacts are altogether more complex to retrofit, (i.e. making social impacts of urban transport more sustainable), because social retrofitting requires a different set of objectives to be introduced, including concerns for socially equitable outcomes.

6. Generic Lessons

6.1.1 Introduction

This part of the Report seeks to provide an account of the lessons that are believed to be broadly generic in nature, in that they appear to resonate extensively across the countries and case study projects reflected in the research programme. The lessons themselves are drawn from a synthesis of the analyses prepared by the OMEGA Centre and its Country Partners, and the lessons offered by both sets of parties in relation to (particularly) the 'four tests' (see Section 2.4 of this volume) where: Test 1 concerns the achievement of project objectives; Test 2 concerns contributions to sustainable development visions and challenges;, Test 3 concerns the treatment of risk, uncertainty, complexity and context in decision-making; and Test 4 which provides a synthesis of Tests 1-3 conducted at a case study level with key findings from the Country Summary Reports. These analyses and lessons were prepared with a view to also responding to the OMEGA Overall Research Questions (ORGs) and Hypotheses (ORHs) (see Section 5 of this volume) which represent a critical input to the lesson formulation process.

Against this background, this part of the Report does *not* seek to repeat all of the lessons that were derived for individual case studies or countries since the likelihood is that a great many of them are very specific to particular locational, economic, cultural, institutional and other contexts - these 'context-specific' lessons are provided instead in Volume 4 (see Sections 2-10). However, where it is considered that common patterns of knowledge can be derived from such context-specific lessons, these have been used to inform and support the formulation of the generic lessons outlined below.

The following therefore provides an account of generic lessons clustered around key themes discussed in Section 4 above. It is important to recognise that many of the theme-based observations presented in Section 4 are *themselves* very important lessons for MUTP planning, appraisal and delivery. With this in mind, these observations are provided in summary form below (in italics in shaded boxes) as a prelude to the generic lessons later presented.

At this juncture it has to be acknowledged that there are clearly many interrelationships between the various lessons cited below with the result that it is unwise to consider an individual lesson in isolation since many are applicable to multiple themes/sub-themes. In addition, these many interrelationships also result in some repetition of the research findings where key themes and lessons overlap. Such repetition is also seen as necessary to place each lesson in context and to ensure they are adequately presented as discrete statements.

6.2 Theme 1 Lessons: Determining MUTP success and failure

6.2.1 Sub-theme: Key challenges in judging success and failure

Sub-theme overall lesson: The changing demands placed on MUTPs can make it excruciatingly difficult to judge project successes and failures.

Lesson #1: The lynch-pin to the 'success' of MUTP planning, appraisal and delivery is how such projects are framed for assessment purposes. To date, the most common criteria employed for judging project 'success' are the project management criteria of completing projects on time/on budget/as per specifications - and yet these criteria were found only capable of presenting a partial assessment. Furthermore, the most commonly employed appraisal methodology *ostensibly* employed to frame appraisal is Cost Benefit Analysis (CBA) - and yet this tool is widely considered inadequate for purposes of assessing MUTPs' 'success.'

Lesson #2: To make a sound judgement about a project's 'success' or 'failure' it is *vitally* important to have a clear sense of the overriding context(s) that prevailed at the time the MUTP was conceived, planned, appraised and implemented. It is also imperative to acknowledge that the demands placed on such projects inevitably change over time, with the result that 'success' needs to be treated as a dynamic phenomenon whereby yesterday's 'failures' can in some instances become tomorrow's 'successes' (and vice versa).

Clarification: it is critically important to have a clear sense of the overriding context(s) that prevailed at the time the project was conceived, planned, appraised and implemented, since this will have impacted on:

- the *raison d'etre* of the project; and
- revisions that were made to project objectives often introduced to reflect 'bolt-on' needs/desires associated with such matters as newly declared territorial restructuring aims, urban regeneration aspirations and environmental concerns - frequently as reflections of changing political imperatives or visions.

Supporting examples: The evidence collected in support of the above lessons confirms come from projects such as the CTRL, JLE and the Big Dig which show that as time elapses since their completion their sense of 'success' has grown. In all three cases the problematic funding circumstances of these projects attracted considerable negative attention, especially in the case of the Big Dig, which as a result of subsequent benefits that have since accrued have diluted this criticism, at least in some quarters which recognise benefits accruing from agglomeration effects, property/land value enhancements and environmental improvements.

Supporting narrative:

"The fact that it is so heavily used, the fact that it has supported regeneration all along its entire length is a real plus. And it has been reassessed from a business case standpoint, which is again quite positive, so that's quite a coup. Property values have gone up along its length, so to that extent it works quite well. ... I think without a doubt, it's a very successful project. Unfortunately, it cost too much." (UK) "I don't think anyone would argue that the tunnel shouldn't have been built, and in five or ten years time who's going to care. Remember the old saying that goes something like this: people in the present always complain about money and costs and financial issues, but in the long run they remember the vision but they forget the costs." (Australia)

Lesson #3: Published project objectives (including 'emergent objectives') are *not* always clearly presented but instead can be shrouded in a rhetoric that masks 'hidden' objectives relating to such matters as: political power-plays (institutional and individual - both in and outside government), profitability aspirations and responses to lobby groups.

Clarification: The contention here is essentially based on three key observations: (1) that published MUTP objectives are often stated in a sufficiently vague manner as to render them vulnerable to multiple interpretations (for example, objectives such as those which state overarching aspirations regarding territorial or sectoral restructuring and growth, and 'regeneration'), which may of course be welcomed by those parties that stand to benefit from the uncertainty that such lack of clarity creates; (2) as a corollary, objectives are frequently stated in such a manner as to make them difficult to operationalize – again, creating uncertainty on the part of public and private sector stakeholders, and; (3) objectives presented in the public domain may represent what are seen as the politically 'acceptable' reasons why a MUTP is to be implemented, although other 'hidden' agendas such as the promotion of private sector involvement in infrastructure and real estate development and electioneering are equally significant.

Supporting examples: Circumstances which confirm this lesson were noted in a number of cases. For example, the Big Dig was supported by real estate, business and construction interests hoping to see direct financial benefits from the project, while CTRL became implicitly linked to the Government's ambitious regeneration strategy centred around the development of the 'Thames Gateway' area. The Oresund Link was driven by a political vision of cross-national cultural and economic cooperation, whilst he JLE was seen as a key element of London's continued dominance as a financial centre and of plans for the regeneration of the Canary Wharf area, and was given higher priority than the proposed Crossrail scheme even though the cost-benefit ratio of the latter was higher. Stockholm's Southern Link originated in the Dennis Agreement (a wider programme of transport projects including a ring road around the city) and, although the Agreement collapsed before construction of the Link began and other road schemes were dropped, the completion of the ring road is seen by some as the only solution to recurring problems with congestion in the Southern Link.

Supporting narrative:

"... if you had an honest scheme whereby people who benefit from enhanced value contributed towards the payment of these schemes, then I would wholeheartedly support it but instead we get smoke and mirrors type of negotiation whereby so-and-so is in there and they're going to make a fat profit and they're going to make sure that the project is finished. We have moved into the era where it's almost impossible to accept that this will cost a certain amount of government money and then we have private partners who will make some money out of this and therefore we have got a deal." (UK)

"What we saw as important while we were building our organisation during these years ... was to understand what kind of commission we actually had been given. Sure, we were meant to build a bridge of steel and concrete and as a construction engineer you sit down and calculate and make sure that it is strong enough. But we realized that this is not enough. [...] We are going to construct a fixed link according to the political agreement and

when you read it [you realize] there is a political vision behind it. Namely that the politicians wanted, through the better transport possibilities the bridge obviously would bring about, to expand the cultural and economic cooperation across the Oresund. They wanted to integrate and develop a common housing and labour market across the Oresund and this vision was important for us to understand." (Sweden)

"Once we have a horseshoe [referring to the shape of the ring road after the completion of the Northern Link], it is obvious that the circle should be closed. But before we have the horseshoe you can't demand from the general public that they realise the value of adding the last missing link. It is obvious that when the Northern Link is completed, there will be a tremendous logic in closing the horseshoe to a full circle". (Sweden)

Lesson #4: For reasons of equity and transparency in MUTP planning, appraisal and delivery, it is most helpful to clearly identify at the outset, project objectives that are considered 'core' or 'essential' and which represent the fundamental reason why the project is being implemented, as against, less certain but nevertheless desirable project outcomes.

Clarification: It is, for example, important to differentiate between the project's ability/role to deliver a 'commoditized service' as opposed to perform a social and/or environmental welfare function, and to denote when which role should prevail over the other. Expectations in this regard need to be both clear and consistent so as to facilitate transparent pre-project appraisal, and post-project evaluation and monitoring. Project objectives, as a consequence, should:

- enable a more consistent approach to project appraisal,
- provide for establishment of measurements and systems/processes (where applicable) that enable clear and transparent appraisal and post-project evaluation, and
- be capable of being operationalized in such a way as to be meaningful to all stakeholders.

Supporting examples: The JLE was treated more as a commodity than a service during the latter planning and construction phases, as was the CTRL and New York's Airtrain. The CTRL and Airtrain original aims, to provide highly efficient transport links, evolved into a projects all about supporting regeneration and development.

Supporting narrative: "One of the things that shaped the project was the political; there was a political imperative to run people through downtown Jamaica which is not the most direct way to get to Kennedy Airport from Manhattan, and from mid-town Manhattan, which is the destination for most of the people arriving at Kennedy Airport and the starting point for most people going to Kennedy Airport. And now ... the boosters in Jamaica, of course favored the idea of having everything go through Jamaica because they had visions of convention centers and so on, building it up tremendously, that's commendable, but it doesn't seem I don't think that that should have been the driving force behind the project, since clearly what they did was not the most direct way to getting people to where they wanted to go." (USA)

Lesson 5: Project objectives relating to time/cost/quality (the 'iron triangle') criteria remain important *but* should not be considered as the sole yardsticks for determining project 'success'.

Clarification: This lesson was born out by the transcripts of OMEGA research programme interviewee responses which highlight a number of key factors, namely:

- the benefits/costs of impacts associated with MUTPs are often: very difficult to discern at the outset; often only realised in the long-term; unexpected/unintended, and change in nature and severity over time; and
- given the above, the current appraisal approaches/methods/tools are simply unable to capture, weigh and accurately predict *all* aspects of project outcomes in the short, medium *and* the long-term simultaneously.
- It thus may be postulated that key project-based financial concerns in the short-term ought to be more about issues such as 'value for money' and affordability rather than the ability of a project to be self-financing or generating a profit in the long-run. It is in such circumstances, especially important to be clear about time/cost/quality objectives for private sector-funded projects so as to ensure that the promised outcomes is understood and ultimately delivered.

Supporting examples:: The above are readily recognised by many key MUTP promoters and decision-makers (especially politicians) who often override techno-rationalist judgements in favour of broader/grander considerations related to visions for future development, political expediency or sometimes just pure 'gut feeling'. This overriding of techno-rationalist advice by politicians was most vividly illustrated in the case of the: CTRL, JLE, Oresund Link, Big Dig, Perth-Mandurah Rail Link, TGV Med and Rion Antirrion bridge

Supporting narrative:

"After so many years I have to say, I think that decision was a brilliant one. Doesn't matter whetherit pays. What matters is, it stood the test of time under the worst possible circumstances. People are going to praise the railway, you better get that from the tourists who use it. They love it. Of course they need subsidise. They don't know that. But actually the subsidiesnot the issue, the alternative is the issue." (Hong Kong)

"We know about actually for the financial itself is not so worthwhile to do it; but as an international airport, you must have some kinds of link, a very fast and efficient link between the airport and the urban area." (Hong Kong)

"[Traditional CBA's where you measure travel time savings and reduced congestion and try to put a price on these criteria – they are not complete. They tend to underestimate the value of the investment since they do not account for the possibilities created by for exploitation for housing and workspaces. It can concern enormous values that you otherwise wouldn't get". (Sweden)

6.2.2 Sub-theme: Differing perceptions of success and failure

Sub-theme overall lesson: All decisions are made based on an individual's or group's stakeholder perceptions and the levels of risk, uncertainty and complexity prevailing (or anticipated) in that context at the time of making such decisions. Moreover, MUTPs are perceived as different things to different people, depending on their responsibility/ involvement with/ in the project and their training and interests.

Lesson # 6: Despite the publication of 'official' objectives for MUTPs by government and other project sponsors, different stakeholders/stakeholder groups frequently continue to have fundamentally different expectations of such projects overall and during the project planning, appraisal and even delivery stages. **Clarification:** These circumstances (and the presumed attempt to reach a consensus) may in part account for the fact that project objectives are often *not* made sufficiently clear at the outset. What this lack of clarity about expectations does, however, is to prolong the debate and confusion about the project's key functions, frequently leading to delays and scope-creep when the objectives are operationalized. Alternatively, others argue (depending where you stand), that these more fluid circumstances provide key MUTP stakeholders room for manoeuvre ('time to breathe') to strike-up new agreements as circumstances change in an acknowledged fluid policy and business environment.

Supporting examples: Examples of these experiences among the OMEGA case studies include Attiki Odos, where route development was *not* sufficiently open to consultation during the early planning stages, leading to a significant challenge from impacted stakeholders with higher expectations of environmental sustainability. The JLE project saw conflict between the differing public and private sector objectives leading *ultimately* and fortuitously to the development of a considerably stronger and more viable project. This is despite the fact that the private sector representatives remained confused over the ultimate objectives of the final JLE scheme, and cite in interviews with OMEGA researchers many instances within the final specification of the JLE of what they see as 'scope creep'.

Supporting narrative: "... if there had been a vision it would have been counter-cultural and so the press and opposition would have undermined it. The vision would have affected more money, so it would have been open to criticism by the economists.....the Treasury would have briefed its friends. There would have been marginal seats affected, the opposition trying to win or hold these seats would have been against it. The media would have said 'it's expensive and there is no payback, there are other ways' – so the whole thing would have been eaten into. Whatever this country does you can be sure the rats will get at it!" (UK)

Lesson # 7: Irrespective of the output from 'official' pre-project appraisal and postproject evaluation exercises, stakeholder perceptions of success are frequently: highly individual, expressing a wide range of views; based on a particular aspect of a project (e.g. success of delivery process rather than the 'final product'); based on emotional responses to a project (such as pride and aesthetic appreciation - common with bridge structures); transient, such that today's failures become tomorrow's success (and vice versa).

Clarification: It is interesting to note in this context that even those projects that seemingly meet a number of their internal/functional objectives may be viewed as failures (especially when such projects become detached from their accompanying narrative).

Supporting examples: Both the Sydney Cross City Tunnel and Hong Kong's Western Harbour Crossing are recognised as being highly successful in engineering terms but unsuccessful in delivering the improved traffic conditions that formed their basic underlying rationale. Perceptions of the M6 Toll Road diverge widely between those who appreciate the congestion-free route and those who object to paying the tolls. In the Netherlands, HSL Zuid was delivered successfully but has been less successful in its primary objective of attracting passengers from the airlines, due to the lack of reinforcing complementary transport policies. The Millau bridge and, to a lesser extent, the JLE, have become tourist attractions by virtue of their aesthetic appeal. The Athens Metro is judged a success at least in part because of the process of knowledge transfer and institutional capacity-building that it facilitated.

Supporting narrative: " ... the road is a success, it does what it says on the tin. Its ability to do more is limited by those people who are making an economic comparison and can't justify it and those who have a particular preconception about it – 'I won't bloody use it and I never will!' – ... the diehard environmentalists who write letters saying it's a disaster but have never driven on it once, to see what the effects truly are. With controversial issues like this you are always going to get a small element of that" (UK)

"One set of people see it as a success and another set of people see it as a failure. ... Engineering wise, it is brilliant. ... now the real estate has all gone up. It's really picked up. There are many more buses that can run through there and it's really changed the essence of crossing the city, but on the other hand if you look at it in the negative aspects of it, it is an expensive tollway. It is not cheap. It was very expensive to build something in the city. ... I think it's just an engineering excellence but, at the end of the day, it lost all its glory because it became a political stunt where people thought My God it's \$4 and there were a lot of people against paying that money" (Australia)

6.2.3 Sub-theme : The importance of defining winners and losers

Sub-theme overall lesson: Defining 'winners and losers' is a key foundation for judging 'success or failure'. The identification of potential MUTP 'winners and losers' must take account of the likelihood that these will change over time and this is also is critical in determining 'success and failure'.

Lesson 8: Although defining 'winners' and 'losers' is seen to be of fundamental importance in determining MUTP 'success and failure', it has to be acknowledged that methodologies for determining winners and losers remain somewhat undeveloped and/or are overly dependent upon rather coarse-grained and contextually insensitive mechanisms such as CBA.

Clarification: A key question that needs to be posed for each MUTP during pre-project planning and appraisal and post-project evaluation and monitoring is: 'from who's perspective is the project judged a success or failure'? Moreover, it is important to recognise that for MUTP planning and delivery agents:

- it is frequently *very* difficult to determine an appropriate balance (in terms of outcomes) between winners and losers;
- this dilemma is made even more problematical if one accepts that even identifying
 precisely who has 'won' and who has 'lost' the extent to which each party has won or lost
 is also problematical; and
- the identification of winners/losers may remain uncertain for some considerable period (many costs/benefits will only emerge at a future point in time) and will ultimately depend upon individual stakeholder's perspective.

Supporting examples: None of the case studies reviewed by the OMEGA research programme employed an explicit framework to assess who were the principal 'winners' or 'losers' either as a forecasting exercises or a post-project evaluation and monitoring exercise. Moreover, in many cases processes of public engagement have been sub-optimal, for example the TGV Med caused significant opposition when it was initially introduced to local politicians and residents as a fait accompli. Both the Athens Metro and New York Airtrain progressed amid signs of disregard for local concerns, whilst the controversy surrounding surface road closures associated with the Sydney Cross City

Tunnel provides an example of trying and failing to please first one group of stakeholders (pedestrians) and then another (motorists).

Supporting narrative: "I opposed parts of the alignment, and remembering this thing went over 15 years. And it ... kept meta-morphing into different things and so there were stages where I supported it wholeheartedly and then when we got overturned I opposed it, you know it was a long process, a wearing process. And ... we basically got a reputation of always opposing them and they just closed us out. You know that is what happens when you are an agitator you just, in the end, you don't get asked." (Australia)

"We fight against the project opportunity, against the layout because all the people said OK for the TGV but not in my backyard, that was exactly what Mitterrand's friends said. This aspect is related to the justice and equity between all the citizens, in front of the public service, the law, and the State. We made a lot of work in this debate, during almost five years. But it's important to notice that it was a real debate, not superficial, not just concerning by the backyard. Our fantasy was to say that we could contest the layout in terms of social justice and equity. We wanted to show that the choice made by the SNCF was not the only one possible, that's why we made our own research and public investigation." (France)

"The public reacts because their views are almost never taken neither they receive a single reply. There is more benefit if there is noise created with demonstrations, etc. So the political element counts more" (Greece)

"... when we first met with the Port Authority and they were telling us about this wonderful project and somebody put his hand up and said: well, this thing is going to be ugly and noisy and I am going to look at this from my house and the guy from the Port Authority said well, close the window and pull the shades down. This set the tone for the relationship between PANYNJ and the community in Queens." (USA)

6.3 Theme 2 Lessons: The need for strategy

6.3.1 Sub-theme: MUTPs as agents of change

Sub-theme overall lesson: *Planners, appraisers, delivery agents and operators need to consider MUTPs as more than 'projects' since they are often 'strategic change agents' that have far reaching spatial, economic, environmental and other impacts at different phases of their lifecycle.*

Lesson #9: MUTP planning, appraisal and delivery strategies need to identify which forces of **change they are trying to influence or harness. Here, it is presumed that the vision(s) of sustainable** development is the 'overarching vision' to which MUTPs are expected to contribute and that the harnessing of any forces the project musters to this end can only be considered desirable. Of particular importance, given the nature of many/most of the OMEGA case studies, is the relationship between 'strategy' and forces of change affecting sustainable growth, especially economic growth ambitions.

Clarification: Many OMEGA case study findings point to the fact that the relationships between MUTPs and broader spatial/sectoral planning frameworks are neither fully understood nor properly exploited through meaningful policies and programmes – especially in relation to the pursuit of 'sustainable development'. This may lead, on the one hand, to missed opportunities for MUTPs to effect beneficial change and, on the other hand, a serious under-estimation of the short and longer-term impacts of such projects. This also

raises doubts about the ability of current, rather narrowly focused, appraisal methodologies to successfully address the multiple forces of change that may accompany a MUTP.

Supporting examples: For many of the case study projects interviewees suggested that a singular lack of attention was paid to the 'agent of change' potential of MUTPs, often resulting in a series of 'lost opportunities'. This reflects the rather narrow framing of such MUTPs solely as providers of transport infrastructure – as was the case for The Western Harbour Crossing, Randstadrail, Beneluxlijn, JLE and Athens Metro for example – without due attention being paid to their potential capability to directly or indirectly stimulate urban regeneration and wider spatial and sectoral change. Conversely, projects such as the Hong Kong Airport Express, Tokyo's Metropolitan Expressway and Oedo Line, Sydney Cross City Tunnel and CTRL were inherently positioned as components of broader agent of change strategies (albeit with varying degrees of success and bearing in mind that agent of change objectives were not always a part of the initial raison d'etre of the project – as was the case for New York's Air Train and the CTRL).

Supporting narrative: "When we have that kind of idea of having the secondary CBD there, the Town Planning Board and the locals and the construction industry and property developers are all for it ... Now they are asking for \$30,000/40,000 square foot. By that time we already envisaged that kind of high-class development. We think there would be some kind of businessmen that would like to live near to a mass transit node, so that he can travel to the airport easily. But we really never dream of that kind of the land price. So even MTRC maybe saying that they would have not enough of revenue, they sell it off too early." (Hong Kong)

"The primary issue for us was try and remove traffic from the surface of the CBD and have it go underground with a view then to improving the public domain and civilising the surface if you like or at least providing greater priority for pedestrians ... and we saw tremendous opportunities for creating a grand boulevard that came into Central Sydney. ... " (Australia)

Lesson #10: The potential for MUTPs to change the context into which they are placed is often under appreciated by MUTP decision makers from both the public and private sectors. This can result in unexpected and unintended consequences which may be beneficial or problematic.

Clarification: MUTPs themselves may also positively contribute to the pace of change. This is particularly important given the likelihood that inadequate sense-making of context very often later leads to dysfunctional and/or unexpected developments - both in relation to later phases of the project lifecycle and in respect of changes that occur in city and regional systems after MUTP implementation. This has to be recognised as a particular problem in the short run in situations, especially where the prevailing planning, institutional, legislative and enforcement mechanisms (and political will) are weak.

Supporting examples: These circumstances were noted in the OMEGA research programme especially in the case of Greece where all three MUTP case studies have quickly spawned much uncontrolled urban development/sprawl. It may also feature in relatively 'mature' contexts where the opportunities afforded by 'agent of change' impacts are unforeseen, as was the case for Hong Kong's Western Harbour Crossing, for example. The JLE had a profound effect on the City of London planning policies fighting to make city of London office space competitive with Canary Wharf. The JLE cost over-run also profoundly influenced the government view of public sector management leading to a disastrous PPP initiative for the London Underground, and the tightening by Treasury of

project appraisal as specified in the green book, Similarly TGV Med directly influenced decision-making procedures in France creating considerable controversy

Supporting narrative: "... the contractor and others bought land on the sides. Land has been valorised in the same (stupid) way as in the rest of Greece. It influenced the path Athens took" (Greece)

"... [Canary Wharf] is here largely because of the Jubilee Line extension. If it hadn't been built this wouldn't have been enabled. London would not have been able to develop its position as a centre for global financial transactions in the way that it has ..." (UK)

Lesson #11: MUTP objectives should clearly reflect the degree of interaction they are anticipated to have with the spatial and sectoral 'areas' they traverse and impact. This should, be based on clear policy statements that acknowledge the 'agent of change' expectations that accompany project planning and delivery.

Clarification: An approach of this nature is seen to be especially important if MUTP planning, appraisal and delivery is ever to successfully come to grips with the concept of 'sustainable development' (with all its sometimes competing dimensions). This requires dedicated strategy formulation and on-going testing. Moreover, the relationship between a MUTP and the territory which it is expected to influence needs to be very carefully considered - especially in terms of the timing of such an intervention relative to other broader contextual cycles and the lifecycle of the place(s) that are expected to change (neither 'too early' nor 'too late').

Supporting examples: The above circumstances were noted at the macro scale by in several OMEGA case studies, including in Hong Kong Westrail which was a victim of the onset of the Asian financial crash, the timing of the HSL Zuid & CTRL pit there business models against the rise of low cost airlines following European deregulation in the aviation industry. The Japanese projects were impacted by collapse of bubble economy. At more local scales, examples of poor acknowledgement of context are seen in the Sydney Cross City Tunnel and the Perth to Mandurah Railway.

Supporting narrative: "... there's always been a great deal of scepticism. ... the concept of William Street as a sort of semi-Parisian boulevard, just made people fall about laughing; this unfriendly hilly, quite steep, traffic throughway with cars on one side and various dodgy other buildings on the other ... which, by the way, ran east/west and therefore was permanently shadowed against the northern sun. It's not likely you can have your sunny spring-time stroll down the tree-lined boulevard or something unless they had planned to put trees in, which they certainly haven't; there's a few scraggly old plane trees along there I think, but not much. It just amused people that anyone would even think of doing that. It's nutty, this windswept bloody street that no one was at all interested in walking up and down because it's so steep, unless you had to of course" (Australia)

"It just defied every logic of State government transport and land use policy. There was a strategic regional centre, you have the major transport infrastructure and the two don't intersect. It was just bizarre. But they didn't care they said the community didn't care and the community apart from a few didn't get particularly fussed about it because you know the detailed arguments of rail and land use planning don't cut much on people's minds, and so that was what we got." (Australia)

Lesson #12: It is frequently the case that 'MUTPs' spawn other mega projects and generate/revise already existing spatial plans and urban regeneration programmes.

Clarification: MUTPs in such circumstances become the foci and lynch-pin of new spatial and sectoral development visions on which new plans and related regeneration programmes and projects are hung. The original MUTP's rhetoric can also in so doing be revised to fit the new agenda(s) and related appraisal criteria. On occasions, the rhetoric is stronger than any systematic effort to transform the agenda into new appraisal criteria leaving 'iron triangle' criteria to be still inappropriately employed as a basis for judging the 'success' (or otherwise).

Supporting examples: The above circumstances were noted in the case of the CTRL (especially in the case of Ebbsfleet and St. Pancras/King Cross transport hub developments and HS2 and the Olympics), the Perth Mandurah Railway (with its station-orientated developments) and the Oresund Link (with its new town and urban regeneration impacts around Malmo). These situations can fundamentally change previously held positions regarding preferred patterns of spatial and sectoral development on a local, regional and even international scale. Other situations arise whereby MUTPs are in fact a product of earlier mega projects outside the transportation sector, as in the case of the JLE (being spawned by a private sector vision for the further development of Canary Wharf) and Stratford International (spawned by the London Olympic Games). The Oedo Line was facilitated by a public sector institutional spatial restructuring programme., These spawning characteristics of MUTPs were also identified by earlier research reported on by the Snowy Mountain Engineering Company's findings.

In the case of Hong Kong, the 'spawning' effect has taken place within the context of broader strategic spatial and sectoral plans/strategies (i.e., as instruments of them) as in the case of Hong Kong's Port and Airport Development Strategy (PADS) and its Metro plan. Such circumstances are more likely to call on 'open-systems thinking' up-front, as in the case to a degree of the CTRL (where the project reinforced the Thames Gateway vision). TGV–Med is another example of the latter – as this MUTP contributed to the redevelopment of Marseilles' central area which was France's biggest urban regeneration project, and very much linked with the arrival of TGV at Marseilles main station.

Supporting narrative: "A by-product is that, because of the airport railway, the MTRC actually embarked on a few ground-breaking projects that are really first in the world. One is in-town check-in service for all airlines. ... So actually we brought the airport back to town. So this is very important in terms of town planning and in terms of your transport hubs studies." (Hong Kong)

Lesson #13: The full ranges of anticipated benefits associated with 'agent of change' functions of MUTPs are *unlikely* to be met as a result of delivery alone. Projects need to be accompanied by dedicated and sustained political, policy, financial, institutional and other supported resource commitments/programmes of a more integrated kind than the silo thinking that mono project developments typically permits.

Clarification: Given that MUTPs can take up to 30 years to materialize – from conception to construction – the sustained character of political, institutional and funding support is *critical*. It requires the baton of political commitment to be passed on from one administration to another (often irrespective of political party); in the case of trans-national projects sometimes involving administrations of more than one country or region. In this regard it is necessary to consider the ability of institutional frameworks to survive these long periods of project development. What often transpires is for the institutional landscapes to change

while the MUTP itself evolves, on occasions leading to MUTPs being delivered in new institutional contexts that alter the way the projects are subsequently delivered and managed. In some instances, special delivery agencies are set-up to off-set the risks brought about by such institutional and political developments.

Supporting examples: The importance of sustained institutional and political commitment for MUTP developments is alluded to in several instances in this report. Perhaps among the most notable are the cases of: the Big Dig (benefits of real estate development not controlled or planned for), the CTRL and JLE projects, and (over a shorter period of time), the Perth-Mandurah Railway, also. Interestingly all Japanese examples considered and integrated long-term institutional stability.

The French and Hong Kong MUTPs reviewed represent examples of projects that were part of a wider formal spatial and economic planning strategy which had its own political and funding commitments that made support for individual projects much less problematic. In other instances, as in the case of the delivery of the Greek MUTPs and those in the UK, the projects were delivered in weaker institutional contexts to those in which they were conceived. In the case of Greece, the prevailing weak institutional framework of the projects reviewed can be attributed to the country's current financial and political problems. In the case of the UK, it may be attributed to the institutional fragmentation that has since taken place due to prevailing neo-liberal forces which have led to increased silo thinking and institutional fragmentation.

Supporting narrative: "I think - this is not new policy we're talking about, this is now policy that's 20-odd year old - and I think there is scope to be a bit braver in linking infrastructure investments to planning. I'd rather we have an infrastructure program with a planning strategy that may be susceptible to change or may not get delivered exactly in the timing that's set out than having nothing at all. Because you're completely in the dark and you don't really know what the priority is." (Australia)

"........ you have projects, then you have strategic planning but somehow the strategic planning never becomes a pipeline of projects and that's the part that's missing, this pipeline of projects concept to link up the strategy with what go when." (Australia)

Lesson #14: The challenges associated with activities and decisions for MUTP planning, appraisal and delivery frequently lead to significant cultural changes within the institutions/organisations involved in project development, thereby requiring cognition of the importance of the institutional learning process involved.

Clarification: The reality is that much institutional change/innovation *must* take place within the existing institutional architecture that plans, appraises and delivers MUTPs in order to cope with the new contexts and interfaces that such projects confront. However, retrospectively systematically tracking and tracing key institutional developments, including key decisions and turning points in a project's development - and the driving forces that propelled them - can offer invaluable lessons for future MUTPs both in the UK and elsewhere. The frequent absence of this institutional-learning process represents a lost opportunity of discovering how things might be done better in the future and a lost opportunity for further reducing risks by avoiding the repetition of past problems. What is of further concern is that evidence came to the fore in the research programme that in some instances in the private sector, lessons learned were internalised and not disseminated beyond the boundaries of their own commercial interests as they were treated as knowledge of competitive commercial advantage even though it was gained at the cost of the public purse.

An example of such lost opportunities include the Metropolitan Supporting examples: Expressway and Kyushu Shinkansen - both associated with wider agent of change objectives (reinforcement of urban and regional planning policies) but investigations into the degree to which these have been achieved have not been properly pursued. A positive example of lesson-learning taking place is in the case of the Athens Metro, where the operating company, Attiki Metro SA, developed the culture of a 'learning organisation' in which the presence of highly gualified personnel and interaction with external consultants was seen as an opportunity to acquire valuable new knowledge and reflect on mistakes. Similarly, the challenges associated with MUTP developments - and the contexts into which they are placed (especially financial) - may lead to required changes in approaches to the funding and financing mechanisms of such projects either from the outset or sometimes/too often, mid-stream (i.e., during the delivery/operations phase), when financial restructuring is required. The former was evident in the case of the Oresund Bridge (where the early decision not to draw on public funding has influenced not only the funding structure of the project but also its characteristics and performance) and the latter in the case of the Big Dig, where the Federal government introduced a funding cap in response to escalating costs. leaving the state government to fund the excess.

Supporting narrative: "The TGV Med was the last TGV project under the complete responsibility of the SNCF; after that with the creation of RFF the situation was completely different. The opening to competition in particular obliged the SNCF to work with other people, with private engineers, and that was a huge change for the SNCF guys characterized by their petty bureaucratic mentality. They worked together in a very closed way. But it change a lot, they were obliged to collaborate with other people. They developed new methods for planning and organization". (France)

Lesson 15: Where MUTPs have been assigned broader objectives than providing 'operational efficiency' - which suggest they are required to offer a wider strategic/societal/welfare 'agent of change' functions than merely providing a commoditized transportation service – such projects have potentially far-reaching impacts that are more likely to result in a commitment of significant public sector resources outside the transport sector, especially, at a level that go well beyond the monetized benefits the project is expected to generate.

Clarification: Research conducted within the OMEGA Centre concludes that MUTPs require a policy-led multi-criteria appraisal (MCA) framework that frames and informs (at the highest political level) the political and technical debate(s), and scrutiny of anticipated trade-offs. With the exception of the most straight-forward of the MUTPs – this challenge is evident in all MUTPs seen as 'agents of change' – and ultimately calls for greater transparency and accountability in priority setting and appraisal judgments as advocated by Flybjerg et al (2003). The absence of such transparent frameworks has MUTPs often treated as commoditized entities rather than agents of development which inadequately take into account environmental concerns, social ends and other non-monetized costs and benefits. This typically leads to a new landscape of project 'winners' and 'losers' being created that differs greatly from the project rhetoric.

Supporting examples: Positive examples among the OMEGA reviewed case studies of instances where MUTPs have been employed as 'agents of change' include the Perth-Mandurah Railway - which resulted from a process in which light rail and bus rapid transit systems were also considered, the CTRL project which over time transformed from a direct rail link from the Channel Tunnel to central London to an infrastructure spine for the sub-regional development of the Thames Gateway Regeneration Strategy and JLE which likewise was transformed from a direct rail link from Canary Wharf to Waterloo Station to part

of the London Underground that sought to open up accessibility and urban regeneration opportunities to East London. Also Shinkansen beneficial effect on economy of region and Oedo Line has encouraged development in the areas served. Negative examples include: Hong Kong's West Harbour Crossing, which has been described as somewhat of a lost opportunity to influence the nature and direction of urban development in Hong Kong, and France's Meteor, which did not succeed in facilitating development as planned

Supporting narrative: "I think in Perth we're good at planning for railways. The land use planners are good at planning for railways and pretty good at planning land use around railways, but in terms of the actual delivery of the railways and the stations, the government's not very good at that and that can undo some of the good planning work, unfortunately. I think that's really where the government's priority should lie is in actually linking infrastructure programs to growth management strategies. It's very hard to do because most of these big infrastructure investments are linked to marginal seats and election cycles." (Australia)

"... it must be a single body who coordinates all the planning, construction and management of both railway and property. Because without a single body doing all the master planning and the engineering and the advanced work, it's doom to fail. The reason being that is the railway, if you just ask a railway engineers to do something, they're just very focus on doing the railway. "Don't bother me, I want to build the railway on time and within budget. Don't tell me that railway can combine with the property and try to integrate the property with the railway." That would divert their attention. For the developer, they will say "well, why should I pay more to cover the costs for the railway?" I mean the two area actually may not be on the same page. They might have conflicting objectives." (Australia)

6.3.2 Sub-theme: The need for flexible, robust and adaptable strategies

Sub-theme overall lesson: Strategies for the planning of MUTPs typically need to be flexible/adjustable and robust, paying due attention to: (1) short, medium and long term consequences simultaneously with midterm measures acting as the bridge between short term aims and long term aspirations and

(2) changes in context brought about by such influences as changing stakeholder positions in response to changing international, national and local policies and enforcement legislation..

Lesson #16: MUTPs are seen to be 'organic' phenomena rather than engineering artefacts that *often* need 'time to breathe' in their preparation which can present special times and opportunities that need to be seized and exploited by key decision-makers.

Clarification: The organic nature of MUTPs alluded to above is normally the result of their need to respond to important changes in project context(s) - these changes frequently serve to mould projects during their planning and appraisal stage - as noted across the OMEGA Partner network. The combination of these factors suggests the need for flexible, robust and adaptable strategies that are able to accommodate changes in project requirements and scope up and until the time of implementation when project features, specifications etc. need to be frozen/locked-into. Changes made subsequent to this lock-in stage can prove very costly with much past evidence suggesting that such changes contribute significantly to cost-overruns and delivery delays. Following construction of the MUTP, it is important to once again view such projects as 'organic' phenomena, allowing their adaptation to new policies, economic and agglomeration forces etc. as they transpire, maintaining nevertheless the overall positive contribution to the vision to which the project is to contribute.

Supporting examples: The above conclusions are substantiated by the findings of the analysis of the project timelines and key decision-points of the numerous case studies in the OMEGA research programme which, among other things, highlight the influence on political decisions and policy agenda changes that lead to changes in previous positions at pivotal stages of project developments which in turn lead to 'add-on' /expanded aims for the project or a scaling-down of these aims. Examples of such experiences may be noted in the case of the JLE, where the last minute de-specification of the line to meet government demands for a service to the millennium dome has ultimately led to large upgrade cost. The HSL Zuid could not deliver the specified safety system in a timely manner, which had a significant negative impact on its programme.

The Oedo Line and Yamate Tunnel, both of which were mothballed for several decades due to funding and environmental issues respectively and also Rion-Antirion Bridge which was the result of many decades of planning could be seen as examples of Serendipity and seizing the moment: the two Japanese projects enabled novel solutions to be developed and constructed which would not have been previously possible, whilst the Rion Antirrion bridge profited from both the development of technological expertise in modelling seismic risk and availability of funding at the right time. In a similar way Athens which had suffered decades of pollution and transport crisis seized opportunity to use EU funding to resolve these issues.

Supporting narrative: " ... it was a large undertaking and they thought you could get it all done and sort of, turn it on, and it would go, and in fact, that never works either, and so, one of the things that we've learned over the years ... is that the very best thing is do it in phases, and it not only gives impetus to the schedule because then you can look at – instead of a whole elephant you can just look at body parts and sort of, figure out what's going on. So one of the things we did was phased it, and that allowed us to bring in operations earlier, ... you have a small piece ... then you have the next piece you get that going and then you hook those two together and just keep doing it like that, and we came in and that really was the major innovation that we introduced." (UK)

Lesson #17: Given the organic characteristics of MUTP developments and the 'time to breathe' they often require, the long gestation period that is commonly experienced is not necessarily bad, while fast-tracking can prove lethal *if* insufficient time has been allowed to absorb/deal with the numerous issues they need to address. It is most important, however, that this 'time to breathe' is well managed and not wasted so as to ensure a genuine re-examination of past decisions and future direction involving key MUTP stakeholders.

Clarification: In the sense that the 'time to breathe' can be taken as meaning 'an opportunity to take stock' and reflect on decisions that have already been made and that this time may be long or short - depending upon the nature/potential impact of the MUTP (including its' degree of controversy, cost etc.) – this is a most important lesson. The two important caveat to adhering to this lesson are: (1) that it might *not* apply to all circumstances, especially in the case of more straight forward and less complex projects³²,

³² For the purposes of OMEGA 2, '*complex projects*' comprise those with many and varied shortmedium-long-term objectives that extend beyond functional requirements of time, cost and specification and which may well encompass or express a distinct spatial/sectoral vision. By contrast, '*straightforward projects*' comprise those that are delivered to meet primarily short and medium-term functional objectives, often as a response to an existing, self-evident problem or need. However, it is important to note that both of these definitions expressly exclude technical complexities associated with project design and implementation and are therefore concerned primarily with matters/issues/influences that are essentially external to delivery processes.

and (2) that the 'time to breathe' principle *cannot* be left open-ended in so far as a 'lock-in' stage needs to be entered into to enable the implementation of the project as designed.

Supporting examples: Examples when this 'time to breathe' was well utilized, is in the cases of CTRL, TGV Med and the Perth-Mandurah Railway. Examples of when the 'time to breathe' period was wasted, were in the case of the Big Dig when, after four years of disagreement over the design for the crossing of the Charles River, the Transportation Secretary stepped in to make the final decision. It was also evident in the case of the JLE when the project was put on hold for 18 months following the collapse of the main private sector funding for the project, whilst the government sought what was effectively a 5% contribution to the overall project costs from the Private Sector. Of the projects selected for this interview, OMEGA research suggests that 65% experienced such positive periods of 'time to breathe.'

Supportive narrative: "... it's better that you slip on the programme and you get the project deposited when it's ready. It is in my view a big mistake to try to deposit something to a predetermined program simply because you've agreed the programme and you're going to stick to it whether the project is ready cooked or not. ... So I actually think we should run with long programmes in the preparation of these schemes and not kid ourselves that there is any merit in having short programmes." (UK)

Lesson #18: Flexible, robust and adaptable strategies are needed to oversee MUTP developments on account of the complexities they pose and in order to cope with the 'inevitability' of unexpected occurrences/decisions/outcomes arising from both outside the project and those within.

Clarification: The fact that MUTP developments are subjected to forces of change that take place both external to and within such projects, and that external influences can often have a significant bearing on internal project planning present a complexity of interactions (of influences) that can be unpredictable that add to the internal complexities of the project itself. Experiences of other professions and disciplines where risk, uncertainty and complexity are at the heart of decision-making for planning suggests that the best way of dealing with these challenges is to develop and pursue a strategy that is flexible, robust and adaptable *without* losing the direction of the project's vision by adopting 'emergent objectives' better able to reflect the changes encountered and at the same time clearly elaborate of the vision being pursued and not be suffocated by tight project management criteria alone.

Supporting examples: OMEGA research programme findings suggest that irrespective of how carefully preparatory work is undertaken for MUTPs there will always be unexpected risks that arise. This was evident in the build-operate-transfer (BOT) concession arrangements for the Western Harbour Crossing in Hong Kong, and the project programme for the M6 Toll Road, where risks, uncertainties and complexities arose in the external environment of the project that combined in complex ways to generate unexpected situations as regards the impact of foot and mouth on the project. These outcomes can prove positive or negative - requiring a range of possible reactions based upon flexible strategy components. Such strategies need to be informed by emerging knowledge employed in a way that it adapt strategies - akin to approaches adopted in innovation technology projects.

Supporting narrative: "... the one risk that we never ever considered was foot and mouth disease. And that struck in February 2001. Six weeks, all the land had been handed over to the contractor and fenced off. And there was a tremendous panic in Ministry of Agriculture, Food & Fisheries government about avoiding the risk of spreading the infection. ... we were told to stop work It was a risk that hadn't been considered, and would have been a

contractor's responsibility. In the event we said, look, there hasn't been any animals on this land for six weeks, and it's all fenced off, get lost, we're carrying on. And there was a bit of a kerfuffle about soil-borne spores, it was all overreaction, but we all breathed a sigh of relief, but the effect, which was unfortunate, was that statutory undertakers, ... couldn't go on farmland to do diversions during this 18 months of foot and mouth disease. And by the time we wanted them to, so they wouldn't relocate their equipment that crossed over the M6 Toll, because, they could do the bit above the motorway boundary, but if the wires went across farmland, they wouldn't go near. So the contractor had this nightmare trying to get service diversions done at a time without going on farmland, and that caused him a few problems" (UK)

Lesson #19: For both complex and relatively straightforward MUTPs, the implementation/delivery stage will normally be treated as 'closed' systems.

Clarification: Earlier reference has been made to the importance of the 'time to breathe' principle *not* to be open-ended and to ensure that the implementation phase of MUTPs be locked into what is in effect a 'closed system' where the iron triangle criteria of project management are 'king'. The art here is in determining *when* the most appropriate time to 'freeze' a project is and when to re-open it. (This is especially pertinent in that many MUTPs evolve over time and it may be argued that such projects should *only* be frozen after all contextual eventualities have been taken into account which may mean that matters such as cost and programme control issues remain problematical for a considerable period of time longer than is currently expected.

Supporting examples: These challenges were encountered in a number of the case studies reviewed by the OMEGA research programme. In the case of the CTRL, the OMEGA Centre team consider that the planners and project managers of this project coped relatively well with the on-going changes and implement the project within a fairly defined closed-systems approach for the construction of the line haul, in particular, having previously exploited the 'time to breathe' opportunity. The Athens Metro, on the other hand, presented a case in point where major changes (such as relocating Kerameikos station to avoid an ancient cemetery) were introduced *during* the construction period for cultural and archaeological reasons with considerable added cost implications. Another example of introducing changes during the construction phase is the JLE where the new objective to complete the project by the opening date of the Millennium Dome contributed to significant cost escalations.

Supporting narrative: "... the blackmail that we were subject to coming up to the Millennium celebrations where the line had to be opened for the Millennium and towards the end there were ... tradesman walking out...electricians walking out with obscene amounts of money, simply because they had us over a barrel" (UK)

"... as the project proceeded, the state thought of additional works: the pipeline, the antiflood works (fires), the proastiakos, etc which were allowed by the concession contract's altered provisions for supplementary works. If there are things to be done for the public interest, via this mechanism you can also award work directly without going to tenders. The initial budget could not take into account all this" (Greece)

6.3.3 Sub-theme: Clarity of visions, goals and objectives

Sub-theme overall lesson: An 'effective' strategy is one that achieves desirable (political) effects without incurring disproportionate costs (both monetized and non-monetized). Planning strategies for MUTPs need to balance requirements for implementing a vision for the project and its accompanying spatial and temporal contexts with the practical requirements associated with the efficiency of services offered, their cost ceilings etc., and of course, the resources (including institutional and regulatory support) available to deliver the project.

Lesson #20: In the early planning stages of MUTPs, there should be clear statements of their roles, goals, objectives, key assumptions, appraisal criteria and anticipated impacts. These need to be disseminated to and thoroughly discussed with impacted key stakeholders as a basis for arriving at agreements.

Clarification: While having clear visions, goals and objectives for a MUTP is *ultimately* beneficial a number of caveats need to be applied to this lesson, namely:

- the slavish adherence to a particular vision or goal in the face of changing contextual influences is clearly *not* advisable when having a flexible and adaptable strategy means that alternative, and more appropriate, courses of action can be accommodated;
- a key issue is having sufficient knowledge to make informed decisions about *when and whether* to stick with a set of agreed visions, goals and objectives or to change course and pursue alternatives (including a 'do nothing' strategy).

The benefits of adhering to this lesson include:

- the availability of a basis on which to prepare outline project plans, programmes, costs, and impact statements; ;
- providing a basis on which to build political consensus/support notwithstanding the need for subsequent political compromises and trade-offs; and
- offering a clear and transparent basis for stakeholder reaction/debate which *can* help to re-shape proposals such that they achieve a better 'fit' with prevailing/envisaged contextual conditions.

Supporting examples: Confirmation of the benefits of such clarity was evident in the Hong Kong case studies where, as the OMEGA Partner Team succinctly put it: "MUTPs need coherent higher-order objectives that are defensible to society and stakeholders, and are best conceived as result of a shared vision of the future". Such clear visions can become a significant unifying element as was especially witnessed in the case of the Hong Kong's Port and Airport bundle of projects. Conversely, the lack of clear statements about issues such as appraisal criteria can become divisive, as in the case of Sydney Cross City Tunnel.

Supporting narrative: "I don't feel civil servants are trained in strategic thinking or strategic management and as a result the concept of vision is not part of the currency for them. I cannot criticise them because it is the system which is inducting them and socialising them in a way which doesn't make them even think to ask the question." (UK)

Lesson #21: Notwithstanding Lesson 20, having clear visions, goals and objectives *throughout* the planning, appraisal and delivery processes may also be positively harmful *if* this is accompanied by a resistance to change in the face of altering contextual influences resulting from (for example) new stakeholder agendas.

Clarification: While the above lesson may appear somewhat paradoxical given the advice offered by Lesson 20, findings of the OMEGA research programme suggests that having too firmly fixed MUTP objectives may well serve to increase *risk* by reducing the ability to respond to fluid stakeholder agendas and other external contextual changes which make 'project evolution' essential in many instances. The art here is to differentiate between the broad vision being striven after and the alternative ways by which this vision (and modifications of it) can be achieved by the employment of new 'emergent' objectives that are reflective of the new reality and priorities that have since emerged.

Supporting examples: Examples among the OMEGA case studies where too restrictive an adherence to original MUTP visions and objectives marred the outcome of a project include the JLE where project managers slavishly followed the plan for a moving block signalling system. Examples of where a more mature approach being employed that embraced 'emergent objectives' and modified old visions to the new realities include the CTRL.

Supporting narrative: "Millau viaduct is a project where when we started, we were not sure of anything. If you imagine that the success of these projects is due to responses that you bring to questions asked a priori, you are very far from the reality" ...and, Nothing let us think at the beginning that this project will would be realised as a concession PPP, even in the time of the choice of the design and engineering team by the jury in 1996. The decision of PPP has been taken suddenly in 1998 by the Ministry of transport J.C.Gayssot" (France)

Lesson #22: Published MUTP objectives are often insufficiently developed at the outset in terms of reflecting the degree of interaction/impact that such projects are anticipated/expected to have with the areas and communities they traverse, serve and impact upon.

Clarification: This failing would seem to be especially important for those projects that are expected to function as strategic 'agents of change'. Given this finding, it is recommended that any reference to urban agglomeration objectives cited by MUTPs should be accompanied by clear policy statements indicating the scope, nature and pace of 'change impacts', supported by different scenario options.

Supporting examples: Illustrations of the presence of such insufficiently developed objectives within the OMEGA research programme case studies apply to the original objectives of the Rion Antirrion Bridge, Attiki Odos, the Athens Metro, the Oedo Line, the Big Dig and CTRL (see Section 5 above for further details).

Supporting narrative: "I certainly think there's been a retrospective rationalisation, or rather over the course of the project its raison d'etre has picked up every new and a fashionable economic theory along the way. Whether the buzz words of the politicians are regeneration or globalisation, or world competitiveness, any project that's ongoing picks up what it can to enhance its credentials. But one has to say that, as far as I'm aware, when we started out regeneration wasn't on the agenda and neither was globalisation or competitiveness. Nor was climate change, CO2 reduction or anything like that." (UK)

Lesson #23: There is also the danger that published project objectives which are intended to supplement and operationalize established visions and goals may not clearly define the precise composition and expectations of a MUTP.

Clarification: This makes it difficult to properly conduct appraisal and evaluation exercises that are required to assess project 'performance' against such objectives.

Supporting examples: In addition, OMEGA research suggests that it is especially important to define clear objectives for *private sector-funded* projects so as to ensure that the desired 'product' (and outcomes) is understood and ultimately delivered (identified in relation to PPP/PFI projects such as the Arlanda Link and M6 Toll Road.

Supporting narrative: "... we were very very clear and we had to spell this out hundreds of times, ... that the objective of the road was not to relieve the existing M6 but it was to provide an alternative freeflow route ... so we were always quite clear that in fact there would be a little relief to the M6 but it would be quite minimal and it would still be a congested route, ... there was absolute clarity about that and I think then, the tolling mechanism was obviously vital to achieving that because we could say well yes the cost of the road will be kept at a level which guarantees there won't be congestion on it." (UK)

Lesson #24: In the case of very large and complex projects especially, MUTP patrons, investors, planners and delivery agents need to take account of the likelihood that new project objectives ('emergent objectives') will emerge over the course of the project planning and appraisal period if the project is to retain its relevancy in the face of new developments.

Clarification: These arise as a result, among other things, of changing contextual elements, including emerging/changing stakeholder agendas, economic climates and government policies). Such 'emergent objectives' can over time dramatically transform the project, its functions and even its boundaries. They can also inject new elements that make the project more robust to new circumstances/future challenges.

Supporting examples: An analysis of all OMEGA research programme case studies revealed that there was a higher level of achievement of 'emergent objectives' than objectives employed at the outset of MUTPs. In the case of the CTRL and JLE, in particular, emergent objectives ensured the success of these projects. In the case of Japan's Oedo Line, a new city planning guideline encouraging the development of a polycentric urban structure in Tokyo and the Line's emergent objective of increasing accessibility to areas outside the original centre were mutually reinforcing and helped ensure delivery of the project. Too often, the 'success' or 'failure' of MUTPs are judged against the original objectives alone which does a dis-service to the investors and professionals involved in the project as well as the public who become mis-informed about the real full range of criteria employed in the finalisation of the project. (as witnessed in the case of the Big Dig, CTRL and JLE).

Supporting narrative: "Eventually the project happened because of three things - I think probably 'regeneration' was the one which tipped the balance. Not because the regeneration benefits are necessarily real but because they had political support, because people all along the route said let's get this thing built, we don't want this thing planned forever, we want it built. The biggest chunk of money will come from the international passengers, but really the French or Belgian taxpayers.....because of the stupid deal they

did for themselves, and some from commuters. But the political benefit is the regeneration." (UK)

6.4 Theme 3 Lessons: Engaging with project stakeholders

6.4.1 Sub-theme: Stakeholder relationships

Sub-theme overall lesson: Relationships among stakeholders can be considered a critical factor in reducing some aspects of risk, uncertainty and complexity attributed to various stages of an MUTP's development. As part of this, trust, credibility and transparency are necessary factors towards building these stakeholder relationships and facilitates consensus building and risk sharing (see discussion below).

Lesson #25: Effective consultation with key MUTP stakeholders can enable the successful adjustment/revision of project objectives, management of project expectations and help speed-up the project delivery process.

Clarification: Such engagement, however, is much less effective if undertaken *after* project objectives have been firmed-up by the project promoters which can actually *increase* confrontation in certain instances. Stakeholders need to work closely and keep each other fully informed *throughout* the project in order to build trust. This allows the identification of potential issues going forward that could otherwise jeopardize the planning and delivery processes. Stakeholder engagement thus presents opportunities to:

- identify those potential objections that can lead to improvements in project concept and design;
- reduce conflict, which may otherwise jeopardize legitimate project plans and programmes; and
- produce decisions that are fast, transparent, inclusive, robust and defensible and of a high quality.

Supporting examples: Examples of effective consultation among the MUTPs reviewed for the OMEGA research programme include the Perth-Mandurah Railway and two projects for which new consultation processes were established in response to initial public opposition - the TGV Med and Big Dig. Examples of poor consultation include the Greek Rion-Antirion Bridge and Attiki Odos, both of which prompted several appeals to the Supreme Administrative Court. In regard to the Oresund Link it is suggested that stakeholder involvement/resistance contributed to a thorough environmental assessment and stringent environmental requirements.

Supporting narrative: "So what my great disappointment was that we had to do conciliation between the two opposing groups, because we were being seen to be divisive, and all we were doing was saying 'ok' because if we hadn't and if that railway hadn't gone up the freeway it would have been a dog. But today once the railway is built and everybody is saying what a great thing it is for the city revitalisation and everything else and everyone is saying 'gee that was a really great decision' but it was a decision that had to be fought every inch of the bloody way." (Australia)

"This was the moment of truth. [The question was] how public to make this information? We choose to be completely honest and open about the situation and what we did about it. We were kind of concerned because this was before the actual decision to build was made and we were worried that it would start a serious storm against the project. But that didn't
happen; it was almost the other way around. It was as if people were feeling more secure with knowing what was there and that we were going to be cautious." (Sweden)

6.4.2 Sub-theme: Consensus building with stakeholders

Sub-theme overall lesson: The ability to identify and understand the motives, beliefs and values of the wide range of stakeholders involved in or impacted by MUTPs is extremely difficult, but nonetheless vitally important. Consensus-building at the preliminary stages of the planning and formulation stages of such projects is essential with the result that MUTPs must have capabilities in place to allow the constant scanning of stakeholder groups and networks over time, in order to determine their willingness, ability and capacity to exert effective influence on key decisions.

Lesson #26: Determining MUTP stakeholder motives and legitimacy is often extremely difficult – especially as stakeholder agendas/motives and relationships (or alliances and networks) frequently change over time.

Clarification: Faced with the difficulties of determining stakeholder motives and legitimacy, it is hard for MUTP promoters to build consensus *without* there being either a demonstrable need for a project and/or an appealing and self-evidently advantageous vision of future conditions with a particular project in place. As a result, 'successful' MUTP planning and delivery agents are likely to be those that are characterized by a strong intuitive sense of the nature and agendas of stakeholder groups (and their networks), and the likelihood that these will change over time, especially where no formal stakeholder scanning and regulation mechanisms exist. Additionally, MUTPs that are accompanied by a well-placed project 'champion' who is able to build trust and consensus amongst key stakeholders is an extremely valuable asset.

Supporting examples: Concerning consensus building, the Dutch Randstadrail project gives an indication of what can be achieved through consensus to achieve considerable cost reductions, although the Dutch team stress the pre-requisite of evenly powerful stakeholders. Stakeholders involved in the Rion Antirion bridge were able to make a number of concessions to unblock the project, albeit under the dual pressure of time and money, and not in a transparent way.

Concerning the role of project champions, the Attiki Odos project "materialized due to the power and pathos of Minister Stefanos Manos" amongst others. Champions were also important for the Oedo Line, Meteor Project, TGV Med, JLE and CTRL

Supporting narrative: "On the pressures exerted by these owners, we know that this is not inevitably the biggest owners who raised more problems. There was also some phone calls made to the president and after from the president to us: these kinds of phone calls concluded by an 'ok we don't pass there' or 'ok we don't cross this property'. ... But with this kind of people you can discuss in a way, you can always negotiate with them, you just have to take care to leave them a good place for hunting. But obviously if you want to destroy their house or their manor it's quite different: you can't, it's obvious, but if you just want to cross a part of their property it's always possible, you just have to negotiate". (France)

"After the decisive turn is the nomination of Izard. ... he's so important: the TGV Med, it's him. At the moment when he was in function he started to manage the project. (...) According to me, he save the project and the SNCF save the project with his nomination. Even if I don't if the project was so in danger, but you know he really supported the project with all his conviction". (France)

6.5 Theme 4 Lessons: Need for trust and transparency

6.5.1 Sub-theme: Trust, credibility and transparency in dealings with stakeholders

Sub-theme overall lesson: For MUTPs to be implemented successfully, their planners, appraisers and deliverers need to identify which key decisions require a high level of trust and ensure this is delivered. This calls for a differentiation to be made between trustees and trustors (i.e., a clarification to be made of who is responsible for delivering the trust and those who are to expect it is delivered). It is significant here to note that success reinforces trust (and vice versa) and that the higher the risk, uncertainty and complexity associated with a particular action or decision, the higher the need for trust to be honoured and delivered. Of particular significance here is the transparency in the interaction of stakeholders and the role of trust.

Lesson #27: MUTP planning and delivery agents need to be aware that the apparent levels of 'trust and transparency' in dealings between key players will often be viewed differently by individual stakeholders/stakeholder groups. Trust is seen as a fundamentally important basis for consensus-building amongst key political and other influential decision-makers and successful joint working - especially at the project conception, planning and appraisal stages *before* a project has gathered sufficient 'momentum' to have a life of its own.

Clarification: The relevance of the above lesson is perhaps most noticeable in the case of public sector funded projects when key public sector stakeholders become highly suspicious about matters that become opaque in the decision-making of its private sector partners as a result, for example, of their declared need for so-called 'commercial sensitivity' in cases of PPP/PFI projects. Moreover, stakeholder trust is often lost when changes to project objectives are *not* made clear through proper dissemination channels. Such changes - whether abrupt or subtle - require full explanation to all affected stakeholders. In this connection, it should be noted that public and private MUTP planning and delivery agencies that have a track record of trust and transparency are more likely to be seen as 'successful'.

Supporting examples: These experiences were witnessed in the case of publicly-funded projects such as the Meteor and in the PPP/PFI Athens Metro project where in the first instance, regarding the opacity surrounding estimated cost of the line prior to the decision to proceed and the second, the many hidden agendas hidden from public interest groups. They were also exemplified by the M6 Toll Road experience where a subtle change in project objectives was under-appreciated by many stakeholders.

Supporting narrative: "The support for the project began to evaporate steadily once the terms of the PPP agreement started to become clear At some stage, the levels of contracts and so on did become public, or were put on the public record, but for many, many years prior to that, they were not readily available and people and the media were being drip fed details at it suited them. So the more unpleasant, if you like, unpalatable of the details were shielded from the public gaze for quite some time, so that as these were slowly made apparent, some public misgivings started to manifest themselves." (Australia)

"I think the key thing here is understanding what the project was supposed to do. ... you might get people who say, oh it's a disaster because the M6 is still congested, ... it's no different to what it was before the M6 toll was built. And the answer would be that that's not what it was intended to do. In terms of delivering its objectives the M6 toll has done exactly that, it's provided a freeflow alternative and it continues to do that, so in that sense it has

been successful and I think that it would be, really a case of, you need to understand what the objective of the scheme actually was." (UK)

6.6 Theme 5 Lessons: Importance of access to relevant information

6.6.1 Sub-theme: Need for full access to relevant information

Sub-theme overall lesson: The need for full access to relevant information - gaining insight into the performance and ultimate operations of a MUTP - will always help reduce risk. Understanding the dynamics of the context of such project features (and their impact one upon another) highlights the critical importance of possessing relevant information about the dynamics of these contexts as a potential determinant to project 'successes. Decisions made under partial and especially inadequate information expose a project to the influence of uncertainty.

Lesson #28: The availability of high quality project information facilitates the identification/anticipation of moments in time in the project lifecycle when circumstances are ripe for pivotal decisions to be made (see below discussion regarding 'serendipity and happenstance').

Clarification: While such opportunities are not always easy to identify in advance and require constant scanning of existing and emergent contextual elements based on access to up-dated relevant information, this constant updating has cost implications which need to be taken into account. Furthermore, there is also the 'Rumsfeld dilemma' of knowing that "there are known knowns, there are known unknowns but also unknown unknowns." This surprisingly perceptive comment by former US Defence Secretary Donald Rumsfeld in 2002 is particularly pertinent in the context of relevant MUTP information collection here.

Supporting examples: Attiki Odos, JLE, HK Western Harbour Crossing (concerning cost forecasts and the impact of government policy upon the business case), Southern Link Project (concerning forecasted use impacting on the operational efficiency of the project), CTRL and HSL (concerning the advent of low cost airlines and its subsequent impact on the business case)

Supporting narrative: "the whole of the vision in '95 had assumed that the CTRL was delivered in one chunk from the Channel Tunnel to London. ... so it came as a bit of a bombshell in '98 or '99 when the thing was split into two sections on the proposal for the station at Ebbsfleet suddenly shot off into the distance again" (UK)

Lesson #29: Planning and delivery agents need to acknowledge that it is frequently difficult (if not impossible) to assemble all relevant information regarding project interfaces and contextual influences (including changes thereto) given the interplay between the many and varied stakeholder agendas at play in any one period during the project lifecycle.

Clarification: Building on the dilemma identified in the previous lesson, the sheer variety of project interfaces and stakeholder agendas noted in the context of OMEGA's suite of international case studies suggest that this problem is essentially universal in nature.

Appropriate responses to are however difficult to prescribe (being somewhat contextspecific) but it would seem appropriate for project planners and delivery agents to ensure that systems are put in place which can facilitate:

- the identification of all relevant interfaces and stakeholder agendas;
- the proper receipt and processing of relevant data from/regarding these sources, and;
- the adoption of flexible and adjustable strategies that are capable of reacting to the need for change.

Supporting examples: 30% of project returns (such as the Attiki Odos, Athens Metro, Meteor, Oedo Line, TGV Med in its early stages, and Sydney Cross Harbour Tunnel) relate to the lack of project public consultation, which is the lack of information gathering from key stakeholders with the collective power, potentially and depending on country context, to exert large impacts upon a project,

Supporting narrative: "They decided in Paris and we have to follow here to accept the decision without having been consulted". (France)

"The public reacts because their views are almost never taken neither they receive a single reply. There is more benefit if there is noise created with demonstrations, etc. So the political element counts more" (Greece)

Lesson #30: MUTP implementation plans and programmes need to be 'certain', 'realistic' and sufficiently detailed in order to enable the proper integration of implementation actions and activities by all concerned parties.

Clarification: The need for *certainty* grows, the closer a MUTP reaches its implementation, although it is a much sought after quality in *all* stages of planning, appraisal and delivery. It is seen as particularly critical in terms of commitments to the delivery of key project and planning approvals and the undertaking of the physical works on which parallel investment and funding decisions are dependent. This search for certainty in highly volatile political or economic contexts – especially as a project nears its implementation phase - often creates tensions between stakeholders from different public and private sector backgrounds leading to a search for acceptable 'risk-transfer' opportunities believed to reduce/share such uncertainties for the different key parties involved.

Supporting examples:

The HKAR project effectively became an instrument in a political dispute which led to significant uncertainty about financing, and delayed project commencement. HKAR were able to reduce this uncertainty during the project's construction phase by building a relationship of trust between the project management and contractors, which enabled the project to retain contractors whilst the project was on hold. Conversely during the JLE project there was a significant uncertainty due to a loss of trust between project management and contractors, which was not fully reinstated despite a change in project management team (Bechtel), whilst the political context in Greece created high levels of uncertainty for foreign contractors bidding on the Attiki Odos project.

Slightly under a third of Test 3 returns saw uncertainty related to patronage estimates as a significant level of risk, which in turn feeds into CBA calculations

Supporting narrative: "... the contractors managed to drive out the foreigners. Foreign contractors could not interlink in the same way (they put tenders with the real facts of the project, while the Greeks offered very discounted bids, knowing that they would get enough

profit later via the way that programming and awarding of extra works takes place). No foreigner could give a discount of 90%, neither they knew how to get around with complementary contracts" (Greece)

"... the government was on the ropes, it brought Bechtel in, they thought it was the only way of sorting the project out and they paid through the nose for doing that." (UK)

"the government would have to deal with the outcomes ... in terms of what the financial position was, because in simple terms if the traffic wasn't strong enough or the finance couldn't be raised then there would be a gap because it would cost so much to build but you could only finance based on the finance you have and the traffic revenues that are generated. ... But to their credit and that's the benefit of these processes to the government, the government said to the private sector that's your problem, you go and fix it. We are telling you what we want built and we are telling you what the concession deed will look like, how you structure it and make it all work is "up to you"." (Australia)

6.7 Theme 6 Lessons: Issues associated with techniques and approaches to pre-project and post-project evaluation

6.7.1 Sub-theme: MUTPs as 'closed' and 'open systems'

Sub-theme overall lesson: Systems need to be put in place to allow MUTPs to be planned, appraised and monitored as 'open systems' that see 'the project' and its interaction with the 'context(s)' within which it performs as exploratory and organic in a manner that allow for unexpected outcomes to become recognized and accepted as part of an 'emergent order'.

Lesson #31: MUTPs should be considered organic 'open-systems' not 'closed systems' for planning, pre-project appraisal and post-project evaluation/monitoring.

Clarification: Notwithstanding the above stated lesson, the only time MUTPs should be considered 'closed systems' (for practical purposes) is at the time of their construction/implementation. The case for MUTPs being considered 'open-system' organic phenomenon has been earlier made in the report, as has the case for the need at some stage to lock-into a finally decided implementation programme. Here, the case is made for these principles to be especially applied to the key planning and pre-project appraisal phases.

Supporting examples: OMEGA research programme findings suggest that the MUTPs that are treated as 'closed systems': *cannot* be properly appraised as a constituent of the wider (and more complex) context into which they are placed. In doing this they face the reality of having their potential impacts seriously underestimated and, among other things, frequently exclude legitimate stakeholder involvement in decision-making. Evidence of this among the OMEGA case studies was noted in the New York Airtrain, which was not fully integrated within the surrounding public transport network, and the Metropolitan Expressway, an example of a closed system which was forced to become more 'open' by context due to pressure from local residents demanding a more environmentally sensitive design solution. Another example of closed to open projects include the French Millau Viaduct which moved from "a closed system to an open one *under* influence of two main movements: the increasing public sensitivity to sustainable issues; globalisation, in particular through the impact of EU regulation on the trend to open the competition. The Perth to Mandurah

Railway was planned as a closed and carefully bounded system which, following best practice contracting in Australia, was carefully protected from outside interference and scope creep.

Supporting narrative: " ... in my opinion what shaped the project is what shapes so many projects in the day of public ownership and operation of the transit infrastructure, ... an institutional imperative on the part of the Port Authority to maintain absolute control over the project and over the operation of the system once it was completed. They did this in part by claiming, and I think overreaching to some extent in the claim, that in order to use PFC funding the infrastructure had to be totally separated from any other transportation infrastructure, that if you were going anywhere but Kennedy Airport there was no way you could set foot on any part of this. I think that's what underlay the whole thing: they didn't want to have to work with any other agency in operating it, once it was built. (USA)

6.7.2 Sub-theme: Forecasting model use and limitations

Sub-theme overall lesson: A forecasting model can be seized upon by decision-makers hungry for certainty in efforts at promoting MUTPs. There are dangers in such instances where their inherent limitations of such exercises are not appreciated. Evidence-based MUTP forecasting techniques of revenue and or traffic, for example, potentially become problematic if they reflect features or adopt assumptions of contexts that are different from those which it is proposed to apply. On this basis, systems need to be put in place to guard against misrepresentations derived from unchallenged path-dependent analytical and forecasting practices.

Lesson #32: Many of the current principal pre-project appraisal methods and tools are perceived to be *inadequate* for MUTP planning and appraisal purposes, especially the manner in which they are applied, while the main forecasting techniques they employ are deemed too frequently to be flawed.

Clarification: Key issues identified by the OMEGA research programme associated with the current MUTP appraisal and forecasting 'toolbox' include:

- the inability to identify, quantify and 'weight' all important and relevant factors that determine/influence project outcomes with any real degree of precision;
- the lack of attention to future contextual elements/conditions;
- the need to understand that (particularly) political influence is likely to override the outputs from the use of traditional tools, methods and processes;
- the perception that decision-makers are often told 'what they want to hear'; and
- the shortcomings associated with the current toolbox are not adequately explained to decision-makers.

Supporting examples: The inadequacy of Cost Benefit Analysis (CBA) as the principal tool to appraise the social and environmental dimensions of MUTPs was endorsed by 84% of those interviewed by the OMEGA Centre in the OMEGA RAMP Study, while flawed forecasting tools and procedures employed for MUTPs were identified by 39-49% of those interviewed in another OMEGA survey conducted for the purposes of this study. In light of these two sets of findings, a case may be made for the need to:

- enhance current MUTP appraisal approaches by, for example, employing policy-led Multi-criteria Analysis (MCA) approaches that take account of a fuller set of considerations within a broader set of contexts (including policy contexts), and
- adopt stress-testing and future proofing methodologies based on scenario assembly and testing which:
 - as a first step, questions the need for the project as opposed to the 'do nothing' or 'fix first' approach;
 - tests against targets rather than Cost-benefit Ratios (CBRs);
 - looks at potential winners and losers over time though it has to be acknowledged that it is excruciatingly difficult to (first) identify who are the 'real winners' and 'real losers' and (second) determine the relative 'weight' that should be ascribed to each 'winner and loser'; and
 - acknowledges the need to replace 'certainty' about scenario test findings with 'possibilities, likelihoods and probabilities.'

A principal concern that the shortcomings of current project appraisal and forecasting methods (including the manner in which they are utilised) pose is the finding that these limitations are frequently *not* fully understood by those that commission them. It is furthermore conjectured by the OMEGA research team that there is a prevailing professional reluctance among specialists in the fields of MUTP forecasting and appraisal, *except* insofar as these can be marginally improved upon by employing more 'sophisticated' techniques/enhancements. MUTP promoters, stakeholders and decision-makers should be made aware of this marked reluctance on the part of many MUTP specialists to challenge the status quo in respect of their project appraisal and forecasting methods and techniques and look to more holistic and innovative approaches.

Supporting narrative: "... in Greece a political decision can bring first in the list a project that was in the bottom as far as technocratic criteria are concerned. To do or not to do a project is a matter of political decision, however the technocrats might contribute. The communication managers (cadres) will decide which of the proposed projects are more catchy" (Greece)

"The main problem was the Ministers' state of mind, they don't care about the cost-benefit analysis. If the results said that the rate of profitability is correct so we can do the project they are ok, but if it's not the case, they don't care, they just want make what people want even if it's not a good project." (France)

Lesson #33: MUTP project objectives – both original and emergent - *should* contribute to the platform on which to appraise *and* monitor the performance and achievements of such projects in a holistic, clear and transparent manner, simultaneously highlighting wherever possible, when and how these objectives are delivered – and at what cost (and to whom).

Clarification: The OMEGA research programme findings have revealed that many such objectives are frequently *not* stated in a way that make MUTP expectations/outcomes sufficiently clear to enable an accurate assessment to be made. They are, furthermore, often presented in a form that is very difficult to operationalize. This, it was noted, makes subsequent judgements about MUTP achievements problematical. In this connection, while most stakeholders interview responses confirm that the 'iron triangle' time, cost and specification objectives (and related criteria) remain very important (especially during the project implementation phase) there was a consensus these should *not* be seen as the sole means to assess project achievements. This is especially important given the:

- complex (and changing) contextual variables most MUTPs have to contend with (whether, economic, political, spatial, temporal etc.);
- 'agent of change' roles attached to many MUTPs;
- need to acknowledge that the benefits/costs of the impacts associated with MUTPs are:
 - o frequently very difficult to discern at the outset,
 - o often only realized in the long-term, and
 - o often unexpected.

Supporting examples: Of all the case studies reviewed by the OMEGA research programmes, those associated with broader formal regional and national strategies – as in the case of some of the Hong Kong projects and the TGV projects in France – are closest to the lesson cited above. By and large, however, the incorporation of *both* original and emergent objectives in the planning and appraisal of MUTPs took place informally and organically rather than within any formal framework.

Supporting narrative: "When we have that kind of idea of having the secondary CBD there, the Town Planning Board and the locals and the construction industry and property developers are all for it ... Now they are asking for \$30,000/40,000 square foot. By that time we already envisaged that kind of high-class development. We think there would be some kind of businessmen that would like to live near to a mass transit node, so that he can travel to the airport easily. But we really never dream of that kind of the land price. So even MTRC maybe saying that they would have not enough of revenue, they sell it off too early." (Hong Kong)

6.8 Theme 7 Lessons: Need for appropriate governance and regulatory frameworks

6.8.1 Sub-theme: Governance, regulation, risk, uncertainty and complexity

- **Sub-theme overall lesson:** The development of one or more national agencies to provide guidance and quality control over MUTP planning, appraisal and delivery - as part of the process to consider and balance differing views of competing interests - are far and few between. International bodies such as the European Union (EU), increasingly provide standards to assess and reduce risks during the implementation of cross-border projects and projects that fall within their international jurisdiction. Even when such international agencies exist with regulatory frameworks and accompanying codes of practice, however, their frequent limited or non-enforcement status, combined with inadequate inspection procedures, are potentially very problematic against a backcloth of an increasing spirit of globalization, where governments and international agencies - with the support of regulators and anti-trust lawyers etc. - seek to increase competition and competitive practices as a means of directly or indirectly further reducing barriers to competition.

Lesson #34: MUTP planners (in particular) need to be aware of the potential for statutory processes to both increase and decrease levels of risk and uncertainty.

Clarification: Constraints on what commences initially as an 'ordered' planning, appraisal and delivery MUTP system can easily produce conditions under which that system (or systems) shifts to being more complex and increasingly dysfunctional, to a point where it can even collapses into a disorderly and ineffective state. Translating this into the regulative frameworks for MUTP planning, delivery and operations - where public bodies seek to exert

excessive control through bureaucracy – this may result in a slow build up of tension through frustration between MUTP provider and enforcer that ultimately leads to a collapse of the system. Some influential parties in the UK consider the previous Planning Appeals procedures for mega projects fell within this category of circumstances which led to the subsequent setting-up of the Infrastructure Planning Commission (IPC) designed to fast-track the scrutiny and approval of mega projects. This organisation is currently being transformed from an independent guango to a unit within the Planning Inspectorate.

Supporting examples: Whilst this lesson was conceived in the context of the UK, evidence concerning international MUTP case studies suggests that the issue is of wider generic concern. The degree to which individual statutory processes represent an obstacle or a positive benefit will, it should be acknowledged, largely be dependent upon the context in which they are situated. Thus, in Greece (for example), the statutory and institutional framework for MUTPs is seen to be problematic in not being capable to control development pressures generated by them. Conversely, statutory processes were positively beneficial in producing rapid and defensible decisions for some projects, as in the case of the JLE and CTRL. OMEGA research findings also suggest that, *irrespective* of context, political and other decision-making processes can create conditions which are favourable to a particular type of MUTP as in the case of the private sector funded project in Hong Kong such as the Western Harbour Crossing.

Supporting narrative: "The reform of the allocation and financing regime for the motorway concessions led to the appearance of new actors in the motorway landscape: local authorities interested to finance the new projects, lender and investors, users at least, called to take a bigger place in the evaluation of the delivered services" (France)

6.9 Theme 8 Lessons: The importance of context

6.9.1 Sub-theme: Why context matters

Sub-theme overall lesson: The context of any individual decision is unique, if only because of its temporal context, despite common threads and similarities with other decisions. Context is, in other words, never repeated in time, even though decisions may take place on a regular basis in the same place and institution. 'Context', however, encompasses a very large variety of dimensions for decision-making - including culture and societal beliefs/ values, time and space conditions, economic circumstances, institutional frameworks and networks and, not least because of its impact on MUTP decision-making, political influence.

Lesson #35: It is vital that MUTP planning, appraisal and delivery agents undertake periodic sensitivity analyses of the context(s) of project developments so as to identify, analyse and understand the ways in which it/they are likely to impact on their project over the entire project lifecycle since contextual changes will invariably drive pivotal decisions that affect the outcome of the project.

Clarification: It is apparent that MUTP planning, appraisal and delivery agents rarely conduct periodic sensemaking of contextual influences in any formal manner, which is perhaps surprising given that such influences (resulting from changed economic and political circumstances for example) frequently play a pivotal role in determining project outcomes. This frequently leads to situations in which MUTP planning, appraisal and delivery processes simply have to react to contextual change 'after the fact'. Periodic scanning of significant contextual forces is therefore seen as a means to anticipate and/or provide an 'early warning' of the need to adjust MUTP planning, appraisal and delivery systems/approaches.

Supporting examples: The Attiki Odos failed to monitor critical contexts surrounding social and environmental sustainability of the project. This led to a successful court injunction by a influential stakeholder group to change the route, the reactive nature of the intervention would have certainly led to increased costs and delays to the project. The Sydney Cross City Tunnel failed to adequately monitor social contextual forces regarding key stakeholder groups leading to much dis-satisfaction in the final project. Elsewhere, interviewees suggested that there were few (if any) examples where *formal* monitoring systems were established.

Supporting narrative: "But there was a lot of other people saying this is just madness, I can't get anywhere in the city. I'm not going to work in the city anymore because it's just madness, I can't get anywhere, it costs me heaps of money if I go into the Cross City Tunnel and this whole thing is insane. And if you want to call that the sabotage point, that's where people felt they'd been sabotaged, they'd been sold a pup by a secretive government ... it established a deep resentment in the community and I think the let's avoid using the Cross City Tunnel, because it actually costs a fortune on a cost per kilometre basis; it was a very, very expensive toll, and you now had enough service roads reopened to allow people to avoid having to use it, and that's certainly why, to my mind, that they got nowhere near the numbers they predicted, although those numbers were very high to begin with anyway" (Australia)

Lesson# 36: An awareness of 'context' is a key factor in successful decision-making that addresses risk, uncertainty and complexity (RUC) both within and outside the field of MUTP developments. Project stakeholders must identify and appreciate the critical contexts (and interdependencies) that surround pivotal project decision making. Interconnectedness between different elements of context leads to RUC that are particularly difficult to identify or analyse successfully without undertaking some kind of context-sensitivity analysis.

Clarification: The fluid and evolutionary nature of MUTP context(s) and its impact(s) on MUTP planning, appraisal and delivery can make it especially difficult to use (effectively) prescriptive tools, models and techniques derived from other contextual circumstances, especially those based on the notion of a 'closed system' equilibrium as they are often, by their very nature, largely insensitive to such change.

Supporting examples: The value of this lesson was confirmed particularly by the UK case study findings for the CTRL, JLE and M6 Toll Road. Its importance was further substantiated by other OMEGA case studies, especially those from Hong Kong which were developed as part of a suite of MUTPs that were planned, appraised and delivered at a time when Hong Kong was preparing for the transfer of the territory to the Chinese Peoples Republic in 1997. The Hong Kong Administration of the time sought to use these projects as part of a strategy for reducing the uncertainties associated with this transfer and any potential economic downturns that may have transpired as a result. This impact of a 'mega event' affecting MUTP developments was also noted (in a different way and to a lesser degree) in the case of the CTRL which saw the development of a new international transport hub at Stratford and in the case of the JLE which had its completion (a point already alluded to) accelerated on account of the deadline for the construction of the Millennium Dome The discussion about the relationship of mega events to mega projects is returned to below later in the report.

Supporting narrative: "once they announced what they called the ten core projects, we don't think they will change their mind. … I don't remember the internal rate of return of the

project, but I think is very low, much much lower than an average infrastructure project." (Hong Kong)

Lesson #37: MUTP Planning and delivery agents need to acknowledge the likelihood (many would argue *inevitability*) that the constant flux of contextual elements will necessitate a response that adjusts project objectives and subsequent actions which may well need to embrace the 'time to breathe' concept referred to earlier.

Clarification: These contextual influences can affect the ultimate project design, programming, costs, the relationship with territories served/ traversed, or even the rationale of the need for the project at all. The project moulding effects of context should in many cases be seen as fundamentally positive and will require the type of open and flexible approach identified in earlier lessons. Complex MUTPs with multiple interfaces and interactions with the areas they serve/traverse may well need to experience periods when project objectives are allowed to evolve in response to changing contextual influences. This 'time to breathe' period needs to be carefully controlled as earlier noted. Clearly, this view mitigate against the idea that all MUTPs should be accompanied by very clear and unchangeable visions, goals and objectives at the outset.

Supporting examples: Omega research programme case studies which illustrate the above circumstances include: The 1992 global recession and subsequent bankruptcy of Olympia York and Canary Wharf led to an 18 month moratorium on the UK JLE project. This period led to 'time to breathe' and extensive design work to the stations. The Tokyo Metropolitan Expressway project was heavily influenced by the bubble economy and its collapse during the 1990s which influenced the activity of land taking for the project, however the protracted programme allowed for highly successful technical innovations.

Supporting narrative: "When we talk about pivotal events, there no doubt were, but I see it more as a gradual awakening from the 1980s to the realization that Perth's growth couldn't be managed by continual low-density development and unlimited car usage." (Australia)

Lesson #38: MUTP planners and delivery agents need to be fully aware that 'change' is gathering increasing pace in the 21st Century due, among other things, to rapid technological improvements and forces of globalisation.

Clarification: The above finding/lesson resonates especially with MUTPs that have a transnational function.

Supporting examples: Of the OMEGA research programme case studies reviewed, perhaps the most obvious that resonates with the above finding/lesson include the Øresund Link. This project sought to link the economies of Sweden and Denmark with that of Germany and other EU countries (and beyond) by facilitating the enhanced movement of freight and making the cities of Copenhagen and Malmö more competitive in face of fast gathering globalisation forces. The CTRL and JLE were each in their own way seen as projects forces of globalization with the former providing direct access to the European rail network and the latter enhancing the role of Canary Wharf/London as a global financial centre following the 'Big Bang'. Perhaps most notable of all are the projects reviewed in Hong Kong which constituted a part of the overall raison d'etre of Hong Kong – to act as a major international financial and transportation hub of Asia in its bid to remain relevant in its competition with other global centres, such as Shanghai and Singapore.

Supporting narrative: "What we saw as important while we were building our organisation during these years [...] was to understand what kind of commission we actually had been given. Sure, we were meant to build a bridge of steel and concrete and as a construction

engineer you sit down and calculate and make sure that it is strong enough. But we realized that this is not enough. [...] We are going to construct a fixed link according to the political agreement and when you read it [you realize] there is a political vision behind it. Namely that the politicians wanted, through the better transport possibilities the bridge obviously would bring about, to expand the cultural and economic cooperation across the Oresund. They wanted to integrate and develop a common housing and labour market across the Oresund and this vision was important for us to understand." (Sweden)

Lesson #39: For every MUTP, an institutional framework needs to be established which is able to address the broad spectrum of expectations that such projects inevitably engender, as well as the multiple territorial and stakeholder interfaces with which the planning, appraisal and delivery processes have to deal with as a result of rapid technological improvements and forces of globalisation.

Clarification: Despite increasing involvement of global finance, global construction and consulting companies and global franchised operators, the institutional arrangements for MUTP planning, construction and operation can be fragmented and frequently in flux. This can lead to the absence of a sustainable institutional framework capable in a robust way of coping with new technological and globalization pressures over time. While such frameworks need to be appropriate to their context (especially country/cultural, socio-political and economic context - see Volume 4) they should be adequately mandated, resourced and designed to be sustained for many years after a project enters its operational phase, especially where it has agent of change expectations/impacts.

Supporting examples: It is particularly noticeable from the OMEGA research programme case studies that many MUTPs are placed in institutional frameworks that are inadequately tasked/resourced or are incomplete to adequately cope with the fast changing forces and, as a result, it may be unreasonable to expect such projects to remain competitive as well as deliver on the full range of objectives that were set for them - arguably this is the case for Attiki Odis, Rion Antirion bridge, The Big Dig, CTRL, JLE and Sydney Cross City Tunnel because, for example, the lack of previous experience in the Ministry regarding PPP arrangements was problematical during the financial negotiations for both the Rion Antirion Bridge and Attiki Odos.

Supportive narrative: "[the concessionaire] will optimise the toll to give them a maximum level of revenue by the minimum level of maintenance and operation cost for the road, but that isn't achieving wider society objectives in terms of what it's doing for the rest of the road network, ... for the wider environmental objectives ... such as carbon targets ... So I think one might want to look at ... a different concession arrangement that ..., rather than purely be up to the concessionaire to optimise from their point of view fiscal efficiency, would actually deliver wider transport objectives for the country as a whole." (UK)

6.9.2 Sub-theme: Mega events as critical contextual influences

Sub-theme overall lesson: Mega events can have a particularly influential impact on MUTP planning, appraisal and delivery. Such impacts may be both positive (in terms of the resources made availability and 'programme certainty') and negative (in terms of the resource diversion they create away from other projects as well as potentially the undue haste they can encourage).

Lesson #40: MUTP planning and delivery agents need to acknowledge that 'mega events' may have both positive and negative impacts on the risk, uncertainty and complexity (RUC) of such projects.

Clarification: Here such events introduce into decision-making a 'new context' in which the delivery of a bigger picture (in the form of a date-defined mega event) has considerable leverage over the ultimate delivery of the MUTP in question. Some have argued that this kind of stimulus is a form of infrastructure delivery 'on steroids' which while speeding-up and better ensuring delivery of the project by a particular date, can have disfiguring implications in terms of higher cost outcomes and perhaps specification modifications.

Supporting examples: 50 percent of a selection of 12 selected OMEGA research programme projects were impacted by some kind of 'mega event' – where this term is defined not only in terms of international sporting and/or cultural events but also in terms of major political events such as the re-unification of a country (as in the case of Germany and Hong Kong), or in the Oresund Link's case, the occasion of Sweden's joining the EU (and the perceived need to subsequently build new regional links with other parts of Europe). In some cases, the MUTP (or some aspects of it) would *not* have materialized without the mega event. For the UK case studies, 64 percent of Omega research interviewees felt mega events had a high impact on the delivery of the project (this included the Millennium Dome delivery in the case of the JLE and the pending 2012 London Olympics in the case of some CTRL related developments). It has been postulated that London would *not* have won the 2012 Olympic bid *without* the CTRL.

Supporting narrative: "... and we were actively, in the lead up to the Olympics, spending a lot of time trying to improve the public domain for pedestrians and to create a much more civil public space." (Greece)

6.9.3 Sub-theme: political influence as a key contextual driver

Sub-theme overall lesson: *Political intervention represents a key contextual influence on MUTP planning, appraisal and delivery.*

Lesson #41: MUTP planners and delivery agents need to recognize and take account of the likelihood that the scale, cost and often controversial nature of such projects means that political influence/support will remain a critical contextual factor over the entire project lifecycle. MUTPs that have a powerful political champion(s) that offers sustained political support and direction to the project represents a key means to reducing MUTP risks and ensuring project delivery (often against the odds).

Clarification: It is often contended that political influence/support for a MUTP represents *the* critical factor of it materializing and its success. Where this is true, this clearly has very

significant implications for MUTP planning and delivery agents, not least in relation to the role and impact of political champions (see discussion below). Champions fulfil a number of important roles as foci for clarifying/setting/adjusting project objectives, establishing project credibility and offering a mandate for project teams, consensus-building and networking. Together with sustained guidance that may be forthcoming as a result of this political commitment, political champions for MUTPs can increase the certainty that the project is likely to proceed in a prescribed form. The role of political champions has two other important dimensions: the first has to do with the long term vision that they may have managed have both government and the private sector buy-into that legitimates the MUTP. The second, rather paradoxically, has to do with the tendency towards 'short-termism' on the part of many politicians (and civil servants), which engenders a focus on what is considered 'practical' and 'achievable' in the short run. The vision set out by the former type of political champion has subsequent political players transforming projects into outcomes that are moulded into more achievable projects in the light of any new realities that may transpire. This can expose previously envisaged strategic projects to hostile criticism - on grounds that their benefits are too long term and not guaranteed and that they do not generate sufficient returns in the short run. While in other circumstances, they present fait accomplis projects sponsored by past political champions with subsequent modifications undertaken to pruneback their scale and costs – sometimes in a manner that can threaten the very strategic qualities of the project for which earlier approval was given. In this sense, political pragmatism and the fluidity of political agendas can become the enemy of strategic thinking and strategy formulation/implementation - a factor which also needs to be taken into account in project planning (see Theme 2 above). Others see these political interferences as promising saviour from white elephant outcomes. To add to the confusion, as already indicated, some MUTPs originally perceived as 'failures' have over time become regarded as 'successes', while the reverse has also been noted.

Supporting examples: There are numerous examples from the OMEGA research programme where political champions have had a major impact on the outcome of MUTPs. Perhaps the most interesting is the case of the Øresund Link project where the prime ministers of both Denmark and Sweden (over several administrations) ensured the political support and funding against the odds. The influence of political champions was also evident in the case of Attiki Odos and the Rion Antirion Bridge as well as the Perth-Mandurah Rail Link. In the case of the Big Dig – the project had a 30 year history of political championing over several administrations, against the odds. Similarly, the CTRL benefited from the support of political champions in the form of two Deputy Prime Ministers (from two different parties) as did the JLE, which was supported by a Prime Minister through her support for the Canary Wharf project that spawned the need for the new line. In the other cases, such as the TGV Med, the Western Harbour Crossing, the Hong Kong Airport Railway and the Athens metro, the political commitment was derived from a central government determination to deliver these projects as part of a pre-determined packaged vision of programmed strategic projects, endorsed by the highest levels in central government, propelled in some instances, by a mega event.

Supportive narrative: " ... on this MUTP ... the decisions went back up quickly to the highest levels. For instance, M.Valery Giscard d'Estaing considered it as his 'own thing' even when he was no longer President of the Republique. So, there was the politicians' weight which could ... get the project off the rails." (France)

"... lobbying for the tunnel in the first instance and having the Mayor championing the project repeatedly to the point where the government agreed to go for. ... to have the City of Sydney Council and the Lord Mayor being outspoken advocates for it would certainly help ... the Lord Mayor then eventually went on to join the mixed up labour government and become the minister ... so that meant he was still a member of the state labour government. So he ... certainly had a good relationship with the state government." (Australia)

6.9.4 Sub-theme: serendipity and 'happenstance'

Sub-theme overall lesson: 'Serendipity and happenstance' often play an important role in MUTP planning and delivery such that there occur particularly pivotal moments in time when the prevailing context is ripe for decisive action to be taken.

Lesson #42: There are occasions of serendipity in MUTP decision-making when 'once-in-a-life-time' opportunities present themselves that must be seized by key MUTP stakeholders if projects are to take-off and succeed.

Clarification: The notion that the planetary alignment of opportunities (and risks) make the time ripe to go ahead with a MUTP or make a major decision significantly affecting its future is an intriguing concept that arose on several occasions in the OMEGA research programme case studies. It is a notion that is especially understood by politicians and investors who have on their decision-making radar screens a set of constraints and opportunities that can sometimes congregate/cluster in a way that provide 'once-in-a-lifetime' opportunities that hold great promise for risky ventures and 'big gables' (which is what many MUTPs ultimately represent) to succeed. What is important to appreciate is that such parties have the power and means to exploit the advantages presented at the time. Without these such happenings remain notional.

Supporting examples: 77 per cent of those interviewed for the OMEGA research programme indicated that there was some kind of serendipity circumstances in the planning and delivery of the MUTPs they were involved in. An example of such 'happenstance' arose in Greece in the case of the combination of the availability of European Investment Bank (EIB) loans for identified (EU) 'priority transport projects' and of a successful bid to host the 2008 Olympic Games in Athens. This serendipity of events provided what was seen as an *ideal* opportunity to develop all three of the Greek MUTPs reviewed by the OMEGA research programme. The JLE project arose from the vision of the Canary Wharf development exploiting the context of the 'Big Bang' financial deregulation offered in London that spawned a totally new economic climate for global financial services; a vision very much supported by the UK government of the day. The Perth-Mandurah Railway was another MUTP made possible by an unexpected alignment of events – in this case the revenues from the proceeds of incomes associated with an explosion in raw material demand from Western Australia from China and India made possible the construction of a rail project that would otherwise not be considered 'affordable'.

Supporting narrative: "When you are in the midst of it, you don't always understand when something crucial is happening. It is only in retrospect you start thinking about when the actual defining moment took place. It's [different] processes and then it is over. But when did the actual defining moment take place? It's not when you write documents, that's not when it actually happened, instead it's about when you arrive at a common view, something we could agree upon" (Sweden)

6.10 Theme 9 Lessons: Perceptions, assessment and treatment of risk, uncertainty and complexity

6.10.1 Sub-theme: generic risk sources

Sub-theme overall lesson: *MUTP lifecycles are typically fraught with concerns about risk, uncertainty and complexity associated with (inter alia) their: size; cost; long gestation and implementation periods; impacts; uniqueness and fulfilment of specifications (i.e., the 'iron triangle' criteria of project management).*

Lesson #43: MUTPs confront major risks, uncertainties and complexities (RUC) both within what may be defined as 'the project' and in the context(s) of 'the project' - with one set of RUCs impacting on the other in different ways over time, often unpredictably.

Clarification: OMEGA research findings suggest that those risk, uncertainties and complexities seen to be 'internal' to an MUTP are much better detected, understood and mitigated than those that impact on the project from outside. This focus implies that the sources of internal risk, uncertainty and complexity are far more critical to project outcomes than internal ones. While this is understandable as a project enters its implementation phase when a 'closed system' perspective is employed, there is considerable evidence to suggest that this premise is not valid in other planning and appraisal phases when more 'open systems' approaches are advocated. The 'closed system' perspective is reflective of attempts to bound/restrict/contain risks and uncertainties within definable parameters, as well as reduces complexity. However, a case may be made that this practice in reality increases RUCs within the project's 'boundary' by failing to take account the contextual risks, uncertainties and complexities impacting on the MUTP from outside the project.

Supporting examples: The points elaborated above were reinforced by OMEGA research case study findings where 83% of a selection of 12 selected MUTPs identified some form of risk from internal project sources, whilst 67% of the projects also identified RUC from external sources. Some of most frequently mentioned sources of external RUC from the OMEGA case studies include:

- the changing nature of stakeholder agendas during the project planning and appraisal period. Essentially, project planning agents look for 'certainty' and are therefore uncomfortable with the evolutionary nature of many large/complex MUTPs; For example in Hong Kong the pre-1997 pro-development mind-set gave way to a new phenomenon: civil society activism against further reclamation and harbour protection legislation, and generally more thoughtful approaches to development. This placed developments that Western Harbour Tunnel Company Ltd may have considered certain in doubt
- political risk is seen as critical in MUTP planning and delivery especially at the project conception and appraisal stages; for example the Athens Metro experienced extensive political interference in relation to both major and minor project-related issues. Political interference in Hong Kong's Airport Railway led to delays in the first instance - However the project effectively became an instrument in a political dispute which lead to significant uncertainty about financing, and delayed project commencement.
- the inability of current tools/methods to clearly discern and analyze the full range, nature and scale of potential project 'impacts' – compounded by changing contextual elements during the planning and appraisal period. For example HK Western Harbour Crossing was conceived with clear functional objectives. However, these objectives were based on incorrect traffic and development forecasts/assumptions; Smaller than expected traffic numbers used the Cross City Tunnel Project, making it economically non-viable.

- the lengthy planning and implementation period this was frequently cited as the *major* source of risk and uncertainty, having particularly serious knock-on effects for private sector investors;
- the degree of acceptability of projects to users, the general public and media; and
- the wider economic climate and ability to raise funding, for example the Tokyo Metropolitan Expressway project was heavily influenced by the bubble economy and its collapse during the 1990s; Hong Kong West Rail was seen as 'a victim of its time' because of the onset of the Asian financial crisis when the project started which lasted until West Rail came into operation. The financial turmoil had delayed residential property developments along the alignment, affecting its projected patronage and hence the projects internal rate of return; The energy crisis in 1973 that worsened financial status of the Tokyo Metropolitan Government and led to the freezing of the OEDO Line project

Supportive narrative:

"… planning is not just numbers and cost-benefit analyses. It's also vision, goals, and will. Tools are just tools not black boxes. You need human brain". (Greece)

"What really went wrong was the Asian economy crisis because after that people were very tight on their money. At time when the economy was good, more people use the tunnel. At time bad, then more congestion at the CHT." (Hong Kong)

6.10.2 Sub-theme: Perception, nature and assessment of risk, uncertainty and complexity

Stakeholders often perceive risk, uncertainty and complexity (RUC) in a highly individual way. While they typically employ subjective assessments based on experience and common sense, look to consensus building between stakeholders as a means of sharing risk, and display an extensive faith in their ability to manage risk, there are two remaining important points of direct relevance to MUTP planning concerning the assessment of RUC: Firstly the acknowledgement of the importance of 'framing and resolving a wider policy question is not just a technical task, but a social and political process'. Secondly, the acknowledgement that effective communication along the way (to implementation) can often be just as important as the identification and characterisation of risks and their uncertainties.

Lesson #44: It is clear that the perception of RUC and the appropriateness of strategies to address this are highly dependent on 'context' – in its fullest sense (i.e. temporal, locational, *raison d'etre* of an individual MUTP) and stakeholder interests. While risk assessment is seen as a mature methodology in many other sectors and disciplines, such assessments and their subsequent use in MUTP planning, appraisal and delivery need enhancement.

Clarification: Because it is highly undesirable to present lessons that can be taken as totally prescriptive that are drawn from other contexts without adequate sensitivity analysis, OMEGA research programme findings suggest RUC assessments in MUTP planning, appraisal and delivery need to be:

- as all-embracing and contextually sensitive as possible, and able to anticipate contextual change wherever possible;
- based on the concept of risk hierarchies;
- accompanied by constant monitoring and iteration; and
- undertaken collectively so as to expose all stakeholders to the inputs and assumptions used.

Supporting examples: Based on the synthesis of interviewee responses to OMEGA research programme ORQs/ORHs and a review of lessons provided across the OMEGA Partner network, there is evidence to suggest that:

- there is a need to adopt an anticipation-based approach to risk assessment which identifies and takes account of areas where exposure to RUC is likely to be greatest, as in the case of Paris Meteor;
- the preparation of adaptable planning and delivery strategies need to be able to respond rapidly to changing political, statutory, economic and other contexts, as was evident in the case of the CTRL project;
- constant surveillance of contextual change is undertaken, even though MUTP planning and delivery agents need to *ultimately* acknowledge that it is simply impossible to discern, or react to, all contextual change, as cited by interviewees in the case of the Netherlands case studies;
- there is a need to recognise that the complexity associated with the planning, appraisal and delivery of MUTPs involve confronting many professional and organisational 'silos,' and that these are sometimes reflective of the direct involvement of strong technical leaders/political champions who are better able to overcome these potential barriers as in the case of the Athens Metro where there was evidence of significant cultural change supported by external consultants;
- the need to recognise that MUTP developments are especially vulnerable to RUC because of the lengthy planning and appraisal periods that are a prominent characteristic of such projects. With this in mind, it is important that systems are put in place to ensure that contextual change is constantly monitored, enabling strategies, plans and programmes to be suitably adjusted in the light of early warnings of the need for corrective action: JLE had a system in place by which the moving block signalling system would be abandoned if it's development fell behind a set of key milestones, however this system was over-ridden during relatively early stages of the project.
- the need to ensure that long-term planning frameworks for MUTPs are supported by appropriate (and sustainable) institutional, financial and other delivery mechanisms, as attempted in the case of both the Rion Antirion and Attiki Odos projects where the lack of effective and enforceable land-use plans and regulations have been cited as contributing to the negative impacts of uncontrolled development in the areas adjacent to both projects and the subsequent limitation of positive project impacts. There is also criticism that the loose, "fragile" and incoherent legal framework governing planning provides scope for landed interests to push authorities, politicians and the Ministry towards extension of the limits of town plans.

Supporting narrative: " ... they decided they were going to have a moving block system. There wasn't one to buy, so ... the project got into a software development programme with doing something in an environment where everybody was suspicious of it, so it just was an impossibility – it never was going to make it. So, I think one of the very first things that people should learn or know is that you have to limit the amount of new technology, and you should never be in the software development programme on a large infrastructure project – that's for little things, and then over time, it becomes tried and true, and then it's something that you can use." (UK) Lesson #45: The management and mitigation of RUC for MUTPs undertaken using the PPP/PFI vehicles requires particular attention in light of the very high costs involved, extensive potential impacts and the different types of concerns that are as a result evident.

Clarification: Public-private partnership (PPP) and Private finance initiative (PFI) vehicles for MUTP delivery are frequently presented as a means to mitigate risk (especially in terms of promoting the rigorous treatment of RUC in financial terms, supposedly shifting the burden of risk away from the public sector, claiming faster and cheaper MUTP delivery than the public sector could offer.

Supporting examples: Evidence from the OMEGA research programme case studies suggests that:

- in the event that significant delivery problems occur, financial risk exposure almost always returns to the public sector, as was witnessed in the case of Western Harbour Crossing;
- determining an appropriate share of risk between public and private sectors is contingent upon the nature of the prevailing cultural/ideological, institutional, economic and legislative/statutory contexts and the negotiation positions and skills of the public and private sectors. This was graphically demonstrated in the case of the Hong Kong, UK and Greek projects;
- there continues to be the risk that the private sector will deliver what it *believes* it can afford, *not* necessarily what was originally proposed, as demonstrated in the case of the Swedish Arlanda Link project where there was no previous experience within the public administration of these kinds of projects, which meant that consultants from the private sector became involved in the public planning process. However over the project there was tension between the need for private profits and the expectations of public good that had not been present in previous infrastructure projects; The separation of Hk Airport Railway from the airport and its initial conception as a standalone project with operational performance targets similar to that of a private sector project lead to private sector-inspired appraisal and evaluation approaches that did not take into account the impacts of the property and urban developments at Airport Railway station precincts on the wider urban fabric of Hong Kong;
- balancing risk management between the public and private sectors is *always* difficult when gains may only be realised in the long-term, and political horizons are shortterm. Moreover, it can be seen that it is typically *only* in the long-term and/or when problems arise that clarity over appropriate risk share can be obtained. PPP/PFI arrangements pose a level of private sector risk exposure that is frequently underappreciated by the public sector. This may be illustrated in cases where MUTPs require particularly heavy up-front expenditure in return for proceeds that may not be fully realised for a considerable period of time. Most of the case studies reviewed by the OMEGA research programme confirm this, and;
- real estate developments associated with MUTPs *can* represent a suitable means of contributing to the funding of such projects *providing* the 'right' sort of conditions are created/prevail. The creation of such conditions and the striking of an appropriate balance between developing an environment which facilitates adequate financial gain from real estate to secure sufficient funding resources in a highly time-sensitive exercise (on the one hand) and delivering wider transport and other socio-economic improvements (on the other hand) is *extremely* difficult. Evidence gathered from OMEGA case studies highlight that there are a variety of very different ways this is achieved, with the MUTPs of Hong Kong, Japan, France and UK revealing dramatic differences in how this is achieved.

Supporting narrative: "The support for the project began to evaporate steadily once the terms of the PPP agreement started to become clear At some stage, the levels of contracts and so on did become public, or were put on the public record, but for many, many years prior to that, they were not readily available and people and the media were being drip fed details at it suited them. So the more unpleasant, if you like, unpalatable of the details were shielded from the public gaze for quite some time, so that as these were slowly made apparent, some public misgivings started to manifest themselves." (Australia)

"... there is an informal risk management in Greece. Contractors and politicians cover each other for their agreements under the table. What something costs to the contractor he might earn it from some other project as the PPP contractors are at the same time public work contractors" (Greece)

6.10.3 Sub-theme: Innovation and risk

Sub-theme overall lesson: Despite the fact that many MUTPs are promoted with visions of a more high-tech future, their financing rationale typically favours tried-out technology rather than new innovations, principally because new (especially untried) technologies are perceived to add more risk. Yet, innovation is critically important to the 'success' of any MUTP. Such projects may, indeed, themselves be seen as large-scale technical social innovation systems.

Lesson #46: 'Innovation' is frequently seen as a key characteristic of 'success' in relation to MUTP developments, even though applying innovative systems/solutions to such projects can prove controversial, is often highly sensitive to context and is frequently discouraged.

Clarification: It has been claimed that the 'success' of every innovation technology project is built on the rubble of the failure of numerous earlier projects, and that this pattern is typical of the field of innovation technology. If MUTPs are to be treated in broad terms as 'innovation projects' then the follow-on logic from the preceding argument is that the level of expectations of the 'success' of MUTPs is currently typically unrealistically too high. There is, in other words, a need for MUTP promoters to tone-down the rhetoric of promises that go beyond what can be delivered. An examination of these points by the OMEGA research programme suggest that looking at MUTPS in broad terms as 'technological innovation projects' can have the following advantages:

- it can help further reduce RUC in the face of previously unknown conditions and/or requirements;
- it can more openly and transparently advocate 'tried and tested' methods and technical systems where risk exposure is to be kept to a minimum and/or budget and programme requirements are of paramount importance; and
- it can more openly and transparently advocate the employment of new innovative methods and technical systems where risk exposure does not need to be kept to a minimum and/or budget and programme requirements are less constraining, as a means of blazing new technology paths ahead with all the benefits and risks this can potentially yield.

One of the inevitable consequences of innovation and change in decision making regarding MUTP developments is the tension and conflict different stakeholder positions yield between risk-averse parties and more innovative-friendly parries. The outcome of this tussle of

positions often reflects the power politics of the stakeholder positions over times and which party is willing and able to absorb the costs of the risks.

Supporting examples: OMEGA research case study examples that support the above different circumstances include:

- in instances where innovation can help further reduce RUC in the face of previously unknown conditions and/or requirements, the case study of Japan's Oedo Line can be cited, where the risk that the project would not be able to proceed due to public funding constraints was addressed by using technological innovations to reduce costs
- in situations where 'tried and tested' methods and technical systems are more openly and transparently advocated, and where risk exposure is kept to a minimum and/or budget and programme requirements are of paramount importance, the case studies of the Beneluxlijn and Randstadrail in the Netherlands may be cited; and
- in instances where a more open and transparent admission of the use of new innovative methods and technical systems is made and where risk exposure does not need to be kept to a minimum and/or budget and programme requirements are less constraining, the case study of the French Météor comes to mind, where utilising the technological innovation of the 'driverless' metro as a technological show case was one of the project's original objectives.

Supporting narrative: " ... it was my own rule, but it should be a rule always, is that no matter if you're doing a refinery or a power plant, all of which I've done or transport project, you never want more than about 10% new technology, so its 90% tested and true, and maybe 10% new stuff – that goes all the way from LED lighting for the first time – with things like that, you just can't introduce it fast enough because generally it's not state of the art enough to be used in that big of a way." (UK)

6.10.4 Sub-theme: Drivers of uncertainty, and ability to 'control' MUTP planning, appraisal and delivery

Sub-theme overall lesson: In the context of MUTP decision making, the first requirement to comprehend is that 'uncertainty' exists, and that this needs to be communicated to stakeholders. The second requirement is for these same stakeholders to comprehend that the properties of complex systems include emergent' rather than directed outcomes and relationships that contain: feedback loops, 'open' systems, retrospective coherence, an acknowledgement that the whole is more than the sum of the parts and the presence of holonic (hierarchical) characteristics.

Lesson #47: Given the complexity outlined above, the premise needs to be accepted in MUTP planning that some planned operations can *never* be perfectly controlled because many of the decisions made are frequently based on partial information or are made under such stressful circumstances that they impair clear decision-making and conspire to reduce the efficiency of decision making by bringing them into contact with the influence of chance. It is thus prudent to recognise that it is *unrealistic* to expect every aspect of their planning and delivery to be tightly controlled from the outset and that project stakeholders that fail to adapt their original project objectives to new realities reduce the robustness of their projects in the face of change.

Clarification: The lesson posed immediately above would seem to contradict the widely held project management view that project objectives should be clearly set at the outset. The findings emerging from the OMEGA research programme case studies, particularly the

larger and more complex projects, is that *not* allowing sufficient time to respond to changing stakeholder agendas and other contextual influences has the potential to deliver a project completed on time, budget and specification but *not* necessarily suited to the new demands made upon it - environmentally, socially, institutionally and/or politically. In this context, newly emergent 'agent of change' project objectives can have a fundamental impact on previously conceived functional objectives concerning project time, cost and specification targets. Here lies the potential error of judging a project a 'failure' on the basis it does *not* meet its original project objectives or forecasts. Moreover, and perhaps more importantly, the extended up-front planning periods for some MUTPs - and the resulting changing/evolving nature of objectives - may mean that the original reasons why the project is being built can become less or more critical in terms of their ultimate justification.

Supporting examples: This view was endorsed by 71% of interviewee respondents to OMEGA surveys conducted for the three UK case studies, reflecting especially the experiences of the CTRL, JLE and M6. In other OMEGA research programme case studies, this view was confirmed by MUTPs such as the Athens Metro, Airport Railway and Kyushu Shinkansen where 'unpredictable' forces (such as political influence and changing economic conditions) served to render full control of project planning and delivery processes almost impossible to achieve.

Supporting narrative: " ... the Corporation struggled with the number of changes that were happening all the time and just trying to control them. ... changes from design team, from the architects, from structural engineers. ... one thing that was learnt really was the impact, the knock-on impact of one change on so many other trades coming later on. ... trying to keep up with everything that was going on was an enormous problem for everyone concerned. That resulted obviously in a lot of claims later on, was not a good result for anyone either." (Hong Kong)

6.11 Theme 10 Lessons: Role of sustainable development visions and challenges in MUTP planning, appraisal and delivery

6.11.1 Sub-theme: Can sustainable development positions for MUTPs provide the appropriate frameworks for their planning, appraisal and delivery?

Sub-theme overall lesson: The report in the UK context that a lack of shared vision of what 'sustainable development' means (for a particular region or city) threatens to undermine the potential for MUTPs to contribute positively to the delivery of sustainable development. This claim raises a number of challenges for such projects, including: whether they (the MUTPs) effectively meet the needs of intra-generational equity; whether they are adequately geared to address globalisation issues; whether they can promote and advance the principle of socio-economic equity; and whether they contribute to environmental and inter-species equity.

Lesson #48: Sustainable development visions (SDVs) are *not* presently seen as providing adequate frameworks for judging the success or otherwise of MUTPs (both for new projects and in relation to the retrofitting needs of existing MUTPs) due principally to the perceived difficulties in defining 'sustainability' in an operationally assessable manner.

Clarification: The above cited lesson reports on an important finding of the OMEGA research programme, and suggests among other things, that much work is still needed to effectively translate SDVs into realistic, comprehensible, measurable and operational MUTP

objectives. To address this, it is advocated that SDV frameworks designed especially for MUTPs be developed, and that these provide guidance that is:

- clear, consistent and applicable to *all* key parties in MUTP planning, appraisal and delivery (making clear all respective roles and responsibilities);
- capable of being operationalized by MUTP planning and delivery agents, so as to influence decision-making more directly;
- able to strike an appropriate balance between local, global and intermediate issues: for example by considering the spatial scope of the appraisal, not just local community impacts,

Supporting examples: In the case of the three UK MUTP case studies, 85% of respondents to an OMEGA survey felt SDVs *should* play a major role in MUTPs, whereas *only* 55% felt the SDV frameworks offered a better basis for judging the success or otherwise of the MUTPs. (It should be appreciated, incidentally, that these projects were conceived and developed when the operationalization of the sustainability development vision was almost non-existent and principally confined to environmental/ecological concerns). Drawing from these OMEGA survey returns, it was concluded that by and large the UK has an undeveloped set of methodologies for valuing sustainable development outcomes of MUTPs, whereas, in cases in France and Japan (for example) OMEGA research findings suggests that SDVs require long-term appraisal *and* evaluation cycles that need to be supported by sustained political support and institutional frameworks which share in the same vision. It is questionable, it is contended, whether SDVs can expect to be delivered in the *absence* of such institutions.

Supporting narrative: "You need to have a minister willing to make the hard decision. That is the only way it can be done even so that you know you will receive criticism from the parliament and other stakeholders. You have to persistently drive the process by saying: look at the project overall on the long term and the sustainability. ... The overall thinking was not there and it was very hard to change the minds of people." (Greece)

Lesson #49: Powerful institutional barriers exist to the application of sustainable development visions to MUTP planning, appraisal and delivery.

Clarification: Findings of the OMEGA research programme indicate that these barriers are reflected in:

- the fragmented nature of much of the institutional framework charged with the pursuit of sustainability at the local, regional and national level. Different aspects/dimensions of project sustainability are here currently being treated in isolation (and are often divorced from policy and spatial planning);
- the institutional and professional silos encountered. The entrenched project management thinking in MUTP developments that currently prevail in many specialist quarters, for example, does *not* sit comfortably with the 'open-systems' thinking requirements of MUTP developments which look to a more holistic view of 'the project' and its interactions with its contextual forces nor the multi-dimensional nature of 'sustainability' demands; and
- the 'culture' of certain powerful central government ministries (such as the Treasury and or Ministries of Finance) which do *not* see themselves as party to formulating or supporting visions of sustainable development.

Supporting examples: The above three situations were identified from the OMEGA case studies, where in the case of:

• the fragmented nature of the institutional framework (e.g. Attiki Odos);

- institutional and professional silos (e.g. Randstad Rail);
- the culture prevailing where certain powerful central government ministries dominate, one may cite the example of the Treasury for all three UK case studies.

Supporting narrative: "... it is utopian to expect democratic pluralistic tools for sustainable development projects to overrule other influences" (Greece)

Lesson 50: A number of road-based MUTPs are characterised by an inbuilt conflict between (particularly) concerns for environmental sustainability and the manner in which they are funded, in that their continued financial sustainability is frequently over-dependent upon the revenues (direct or otherwise) derived from increased traffic as a means to generate adequate income streams to pay for the project.

Clarification: This inherent contradiction between the goals of MUTPs as agents of enhanced individual and freight movement in the wider interest of contributing to economic growth goals, while at the same time paying for measures that will reduce the project's negative environmental impacts from the additional wealth generated - raises the wider question of whether MUTPs themselves are sustainable? And if so, whether they are contributors to a sustainable vision? Although these questions go beyond the scope of the OMEGA research programme's initial focus – they are very significant questions which are becoming increasingly relevant as we learn more about climate change and carbon footprint outcomes of the world's pre-occupation with hyper-mobility as the basis of the world's economy as we look to a future where MUTP retrofitting is to become increasingly common.

Supporting examples: Examples of such MUTPs among the OMEGA case studies include: the Øresund Link, the Western Harbour Crossing, Cross City Tunnel and Shinjuku Express Way to mention but a few. The Oresund Link requires traffic usage to increase over the medium term in order for the project financing to remain stable; the Western Harbour Crossing economic model seems irreparably dysfunctional; The cross city tunnel project attracted significant opposition from users ex post - The widely accepted story was that the project suffered a revolt by the people of the eastern suburbs;

In cases where PPP and PFI vehicles are used to finance these projects, this suggests that there may well be an inherent conflict between the sustainable development vision the MUTP is supposedly expected to contribute to and the sustainability of the project's funding where toll-road and other indirect traffic related revenues are depended on. In this sense, a case may be presented where MUTPs should *either* not normally be undertaken using the PPP/PFI model or that public sector project planning and delivery agencies should take steps to limit the sustainability conflicts inherent in them by, for example, minimising the length of any concession period.

Supporting narrative: "We are not maximising use of these facilities which have been built, and I think a more open government would look at the possibility of taking over all the tunnels and tolling all roads. I know it's anathema to people to have an open road tolled because it has not been done before, but I think that's the only way of maximising use of the facilities that have been built." (Hong Kong)

6.12 Theme 11 Lessons: Need for lesson learning/sharing

6.12.1 Sub-theme: Need for project-based lesson-learning and sharing

Sub-theme overall lesson: The need for project-based lesson-learning and sharing must be an integral part of MUTP decision making, and to this end, systems need to be put in place for distributing both positive and negative lessons learnt by all stakeholders during each phase of the project. The importance of case history and the existence of a body of 'good (not 'best') practice' derived from a review of such history are essential to project lesson-learning and sharing. This is especially so with regard to the identification and handling of risk, uncertainty and complexity, and the power of context in policy-making, business and professional fields associated with MUTP development.

Lesson 51: There is little evidence of systematic institutional, project-based lessonlearning and sharing of MUTP developments on the part of promoters and other stakeholders - and the dissemination of the knowledge derived from this - in a formalized post-project evaluation sense. This restricts innovation and deprives the public sector of capitalizing on previous experiences they have helped to finance/financed.

Clarification: Given that MUTPs are so costly, it is perplexing why it is that there has been so little systematic examination of past MUTP lessons (and mistakes). The exception to this, the OMEGA research programme discovered, is in sections of the private sector where the accumulated knowledge of past MUTP experiences has significant commercial value offering a knowledge platform that is seen to provide a competitive edge over others in bidding circumstances. If one scrutinizes the global activity of MUTP developments, especially associated with mega events such as Olympic Games, one will observe that it frequently involves many of the same companies and financial institutions who capitalise on their previous experiences in similar projects.

Supporting examples: An examination of all OMEGA research programme case studies reveals, time and time again, the involvement of the same companies. Of the 30 MUTPs examined: Arup was involved in *at least* nine; Balfour Beatty in six projects; Bechtel in five projects; and McQuarie Bank in three projects. The issue here is that while the OMEGA Team learned that some of these specialist private sector concerns had put together an invaluable diary of past lessons for their internal use - thereby building a knowledge base for future similar practice - this lesson-learning is largely kept 'in-house' and is thus *not* 'lesson-sharing'. This has two consequences:

- the first is that the public sector, which commissions, plans and typically finances the bulk of these large-scale infrastructure projects, contributes to generating knowledge to which it is often *denied* access. Of all the OMEGA research programme case studies, 77% (23 projects) were *primarily* funded from the public purse; and
- the other consequence is that this can (indeed often does), lead to path-dependency models of MUTP economic and technological investment, where specialised global players act primarily on knowledge based on their prior experience, which typically leads them to perceived paths of self-interest that are often risk-averse. This practice can severely restrict MUTP developments to 'well-tested' past technologies/practices which rob these projects of their potential greater innovation capacities and qualities.

The Oresund Link, Rion-Antirion Bridge, Perth-Mandurah Railway, C2 Shinjuku Route, JLE and Big Dig, all involved technological innovations although *predominantly* in response to the

physical challenges presented by the site: the Oresund link was engineered to have no impact on Oresund water flow; the Rion-Antirion Bridge was built to withstand high levels of seismic activity from a major fault line, the Perth –Mandurah railway was built upon complex ground conditions including the main water resource for the town; the Shinjuku Route and Big Dig projects developed a number of new technologies to allow sections of the routes to be constructed as tunnels.

Whereas, if one looked at MUTPs at the outset as 'innovation projects', one would more carefully examine the full range of opportunities *as well as* the risks and uncertainties of alternatives in the analyses.

Supporting narrative: "Nobody studies the impact of these projects (after they are completed). Not even the University can conduct a study in Attiki Odos, while abroad there is detailed study of the impacts of such projects" (Greece)

Lesson #52: The acknowledged increased levels of risk, uncertainty and complexity (RUC) in the 21st Century de facto require a significant enhancement of competencies in relation to MUTP planning, appraisal and delivery, as well as their subsequent operations, management and monitoring.

Clarification: The established need identified by the OMEGA research programme for planning and delivery agencies to adopt a broader and more holistic view of MUTPs, especially in regard to their potential impacts as 'agents of change' and the multiplicity of interfaces that characterise such projects over their lifecycle, suggest:

- the need to break-down professional and organisational barriers (silos) that serve to reduce the ability to learn from past successes and failures;
- the need for much better understanding of the influences associated with prevailing and emerging future contexts;
- the need for planning and delivery agents to acknowledge the necessity of developing flexible and robust planning and implementation strategies and programmes that are capable of ready adaptation in the face of changing needs/demands and contextual influences.
- the use of scenario building/ testing (including the examination of 'do nothing/do minimum' scenarios), and adoption of future proofing approaches is seen as a key means to seek to discern future contextual influences on project planning and delivery; and
- the need to provide for greater stakeholder involvement in the planning, appraisal and delivery process and identification of prevailing and emerging/changing stakeholder motives and agendas.

Supporting examples: Of the OMEGA case studies, the following MUTPS are examples of the five characteristics described above:

- From the Attiki Odos, Météor, Randstadt Rail and JLE projects the need to break-down professional and organisational barriers (silos) was particularly evident, on account of: the fragmented local government structure of the region of Attiki i.e. 124 municipalities and 4 prefectures; the counterproductive competition between the Météor and the Eole Lines in Paris; the long history of stalemates, difficult negotiations and fragmented institutions that somehow had to be bridged for Randstadt Rail to proceed; and in the case of the JLE the formation of the LDDC which caused friction and resentment amongst the individual boroughs.
- The HSL and CTRL are two project where it was especially apparent that there was a need for a much better understanding of the influences associated prevailing and emerging future contexts, on account of The 1997 deregulation of the European aviation

industry which led to the success of the low-cost airline business model, produced a significant competitor unseen by both the CTRL and HSL business models;

- Atiki Odos and Rion Antirrion Bridge where there was a notable need for its planning and delivery agents to acknowledge the necessity of developing flexible and robust planning as well as implementation strategies on account of their lack of institutional capacity was compounded by the inability of public institutions to adapt to the challenges of a partnership role in a complex and demanding PPP.
- The CTRL, Shinjuku Route and The Hong King West Rail where the need to provide for greater stakeholder involvement in the planning, appraisal and delivery process was especially apparent, on account of the planning blight caused by the CTRLs initial poorly managed attempts at community involvement; the Shinjuku route residents who were concerned about the local environment asked for amendments to the City Planning Decisions leading to a freeze in the implementation of the project for 10 years; if the Hong Kong government were more open-minded and adopted a more transparent and accountable manner in developing the WHC, various decisions regarding objectives, alignment, phasing and the implementation of related property development might be enhanced.

Supporting narrative: "The LDDC brought a new sense of urgency that really was a key decision although it was deeply resented by most people who lived in east London, the GLC and many of the boroughs and it was quite extraordinary." (UK)

7. Making a Difference: Lessons for decision-makers and key stakeholders

7.1 Introduction

The purpose of this section is to provide *generic* lessons which aim to define '*who should do what differently*' in regard to the planning, appraisal and delivery of MUTPs. These lessons are variously drawn from UK and international case study findings which inform both the content of Section 5 (Responses to OMEGA Overall Research Questions and Hypotheses) and Section 6 (Generic Lessons) and have been grouped under the following headings, which are seen to reflect the principal areas where a real 'difference' can be made by MUTP decision-makers and other key stakeholders³³:

- Need to treat MUTPs as 'agents of change'
- MUTPs should be treated as 'open systems'
- MUTPs as 'organic' phenomena
- The need for the proper framing of MUTPs
- 'Context matters' in MUTP planning, appraisal and delivery
- The role of Sustainable Development Visions in MUTP planning, appraisal and delivery
- Engaging with stakeholders
- The need for full institutional, policy and legislative support
- Lesson learning & sharing is critically important

For the purposes of this section 'decision-makers and other key stakeholders are divided into the following broad categories, which comprise those actors who are perceived to be the most capable of effecting positive and beneficial change to current approaches and practices:

- Politicians operating at the local, regional, national or international level;
- Public sector government personnel principally involved in MUTP planning, appraisal and delivery, together with those responsible for spatial/sectoral policies, plans and programmes that either accompany or are impacted by such projects. For the purposes of the lessons provided below, such personnel are seen to be operating mainly at the local, regional and national level;
- Private sector operating at the local, regional, national or international level and comprising (but not limited to) project financiers/funding agents and advisors, developers, members of PPP/PFI consortia, consultants and contractors;
- Others operating at the local, regional, national or international level and comprising (but not limited to) knowledge disseminators, the media, NGO personnel, and members of lobby and community groups.

It is readily acknowledged that the above represent very broadly defined categories and that there is no intention here to present an exhaustive list of the types of decision-makers and other key stakeholders that impact upon, and are impacted by MUTPs. We believe this to be simply impossible given the generic nature of the lessons and the very wide spectrum of international contexts (with all their attendant institutions, political systems and methods of promoting and undertaking MUTPs etc.) with which we are dealing. Thus, the intention in this section is to present lessons that can be drawn upon by different decision-makers and other key stakeholders as appropriate to the context in which they are most active. It is for this reason also that the following lessons/actions are applied to broad categories of those

³³For the purposes of this section key stakeholders are taken to be those: whose actions/decisions are critical to the success/failure of a MUTP (or a component thereof) in terms of its planning, appraisal, implementation and impacts, and/or; who share information and knowledge about MUTPs (or a component thereof) so as to influence project outcomes or opinions about project outcomes.

stakeholders which are perceived to be the most capable of effecting positive and beneficial change to current approaches and practices.

At this juncture there is a need to highlight a number of other very important caveats that necessarily accompany the following lessons. These are as follows:

- as implied above (paragraph 7.1.3), the following generic lessons are offered on the understanding that they will inevitably need to be applied with caution, having due regard for often unique context that prevails in different countries, cultures, temporal circumstances and the like;
- the proffered lessons are themselves not intended to represent an exhaustive list of all necessary actions to enhance MUTP planning, appraisal and delivery. Rather, the intention has been to focus on those principal areas where different approaches both *can* and *should* be adopted;
- whilst it is clear that a number of the presented lessons are undoubtedly applicable to the retrofitting of *existing* MUTPs, their intention is primarily to influence the planning, appraisal and delivery of *future* projects. This is so because the research programme has (most importantly) discovered that there is a real lack of clarity (indeed almost complete puzzlement) amongst MUTP stakeholders as to how such projects can be retrofitted to enhance their utility and to achieve broader aims and visions associated with sustainability. It is therefore suggested that MUTP retrofitting merits further discrete research.

Readers will also note that it has been necessary to replicate some lessons under different headings where similar actions and/or decisions are seen to be required.

7.2 Need to treat MUTPs as 'agents of change'

7.2.1 Overview of action required

There is a need for a change of mind-set concerning the way in which MUTPs are positioned, framed, planned

This is so because MUTPs frequently become (either by design or by virtue of the nature and extent of their impacts) 'strategic change agents' that have multiple spatial, economic, environmental and other implications. Indeed, we have observed that the potential for MUTPs to change the context into which they are placed is often under appreciated by decision-makers, and this can result in unexpected/unintended consequences which may be beneficial or problematic.

Against this background it is clear that MUTP planning and delivery agents need to be clear about:

- whether an MUTP is *expected* to function as a 'strategic agent of change', and if so, in what way;
- what sort of territorial, sectoral or other type of change it is expected to achieve;
- which forces of change they are trying to influence or harness;
- the relationship between 'strategy' and forces of change affecting sustainable growth, especially economic growth ambitions;
- the timeframe over which such change might be expected given prevailing/forecast/scenario contextual conditions (see below);
- the type of resources (financial, institutional, personnel, legal, etc.) and policy frameworks that are likely to be needed (see below) over what period; and
- what are the potential 'project' boundaries against which to judge the project's 'success'.

It is here that it becomes *very* apparent that *many* such projects are *not* mega projects but 'meta projects' (i.e., programmes of a combination of mega projects) that culminate over time and different contexts as part of an emerging new strategy/plan as an 'agent of change'. Here, any new emergent 'vision' needs to be thoroughly stress-tested and future-proofed through scenario testing, involving key MUTP stakeholders, so as to postulate potential changes in contextual influences over different time periods.

7.2.2 Recommended responses to the need for action

Politicians should:

- where this is not already the case, openly acknowledge and respond positively to the potential for MUTPs to function as 'agents of change' – this should include scrutinising their raison d'etre;
- provide leadership, over a sustained period of time, in regard to the agent of change vision(s) (including those associated with sustainable development see also 7.7 below) that MUTPs in general, and individual MUTPs in particular, should seek to fulfil;
- require as full an account as possible of each MUTP's potential to function as an agent of change in pursuit of pre-determined project visions - whilst at the same time acknowledging that such accounts will necessarily be somewhat vulnerable to contextual change over time. In addition, politicians should demand periodic reports on the achievement of MUTP agent of change visions, goals and objectives over time which can be used as a basis for corrective action where necessary;
- forego short-term political considerations in decision-making in favour of the type of strategic long-term benefits that MUTPs and their attendant visions may produce, and maximise the same where these reinforce long-term strategic benefits;
- provide leadership regarding the need for appropriate institutional, legislative, policy and financial resources required for the realisation of MUTP agent of change capabilities; and
- assist in the identification of potential winners and losers associated with MUTP agent of change roles and functions.

Public sector officials should:

- present (to key decision-makers) MUTPs as having potentially wide-ranging and uncertain impacts over lengthy time periods which sometimes make them 'big gambles';
- identify key (potentially changing) contextual influences that might impact on the MUTP and the areas/sectors it traverses/impacts – and thus its agent of change capabilities;
- present scenarios, future-proofing proposals and SWAT analyses that seek to demonstrate such impacts and the forces of change that might be harnessed by MUTPs;
- seek to identify potential 'winners and losers' associated with MUTP agent of change roles/functions under different scenarios;
- prepare spatial, sectoral and other plans and programmes (as part of an overall strategy) to demonstrate how MUTPs might affect beneficial change over time;
- identify institutional, legislative and policy changes and overall resource requirements that might be required to maximise beneficial change and their role within an overall inter-agency strategy of action (see also 7.9 below);
- placing broad financial and non-financial costs and benefits associated with the above scenarios/future proofing proposals in a *multi-criteria analysis framework* that also allows for consideration of cost-benefit ratios associated with traditional functional criteria; and
- monitor MUTP agent of change impacts over the short, medium and long-term and advising decision-makers of the need to adjust plans and programmes accordingly.

Representatives of private sector MUTP stakeholders should:

- share knowledge about agent of change experiences drawn from other contexts including the recommendation of potential agent of change roles and functions that might not have been previously considered. In parallel, private sector stakeholders will need to advise on the contextual sensitivities that such roles and functions might need to take into account;
- function as a 'sounding board' for potential agent of change visions so as to enhance scenario building/testing and future-proofing;
- examine specific MUTP proposals for agent of change possibilities (e.g. urban restructuring), together with institutional, legal and other organisational changes that might be required and communicate these to public sector officials and politicians; and
- assist in the identification of potential private sector 'winners and losers' associated with MUTP agent of change roles/functions.

Other key MUTP stakeholders should (as appropriate):

- disseminate the need for a change in mind-set associated with MUTP planning, appraisal and delivery whereby MUTP developments are seen as important strategic agents of change, projects of innovation (which by definition incur risks and uncertainties) and which, by their very nature in order to be 'successful', need to be viewed as organic rather than simply engineering and/or transport projects;
- adjust and resource education programmes for students and decision-makers to stress the importance of MUTP 'agent of change' functions and better appreciate the above, simultaneously allocating resources for R& D to better develop capacities to respond to this new understanding;
- scrutinise the degree of transparency with which the agent of change debate is carried out, address areas of opaqueness and encourage wider debate of project objectives;
- assist in identifying potential project winners and losers over time, geographically and economically;
- pressurise governments to facilitate public consultation at the very earliest stages of the MUTP development process;
- assist in identifying agent of change roles/functions and the potential impacts of these; and
- scrutinise the social corporate responsibility of principal MUTP stakeholders, particularly those from the private sector whose interests may be more focused on commercial rather than environmental and social impacts.

7.3 MUTPs should be treated as 'open systems'

7.3.1 Overview of action required

Planning, appraisal and delivery agents need to recognise that MUTPs are phenomena that require 'open systems' treatment in light of their complex and fluid relationship with the areas/sectors that they impact upon.

Such treatment needs to be reflected in the types of systems and processes that are established for the purposes of (particularly) MUTP planning and appraisal so as to enable their potential interaction with the context into which they are to be placed to be seen as somewhat exploratory – thereby allowing for unanticipated outcomes to be better discerned and accepted as part of an 'emergent order'.

As noted earlier in this Volume (see Section 6), the above statement often means that there is a need to acknowledge that many aspects of MUTP planning, appraisal and delivery

processes are difficult to identify precisely, much less quantify. This holds true *throughout* the project lifecycle because of the complexities associated with open systems treatment and the fact that MUTPs are themselves complex (often innovative) systems which interact in multiple ways over time with increasingly complex contexts. It is thus hardly surprising that potential MUTP impacts are difficult to identify at the outset and may only emerge over time.

Against this background it is suggested that:

- an 'open system' approach is required for all aspects of planning and appraisal of those MUTPs considered to be complex and/or capable of significant 'agent of change' functions/impacts;
- important external contextual influences that can fundamentally impact on planning, appraisal, delivery need to be identified and incorporated within plans of action and strategies;
- a 'closed system' approach will be necessary for business case assembly but the fact that this has distinct limitations due to the existence of manifold (and changing) contextual influences needs to be appreciated;
- a 'closed system' approach will be needed once the project is deemed ready for implementation – this will require very careful scrutiny as once a project is 'frozen' (locked-in) for construction purposes the subsequent management of RUCC can be extremely problematical if significant changes are made which can make retrofitting extremely expensive; and
- effective and early stakeholder consultation represents an important aid to effective decision-making rather than a hindrance in taking account of perhaps unforeseen developments (see discussion below).

7.3.2 Recommended responses to the need for action

Politicians should:

- publicly acknowledging the benefits of adopting an 'open system' approach even if this
 means accepting increased uncertainty and potential conflict with short-term political
 goals/gains (these are common features of innovation projects);
- ensuring that 'open' and 'closed system' based information has been appropriately 'placed' in the public domain decision-making process so as to inform such decisionmaking;
- assisting in the identification of potentially powerful contextual influences that are likely to impact on MUTP planning and delivery; and
- acknowledging the valuable contribution that can be made as a result of early and sustained consultation with stakeholders in an open system manner (see discussion below).

Public sector officials should:

- suggest to key MUTP decision-makers those parts of the project lifecycle that they
 consider can and should be treated in an open and/or closed system manner, having
 regard to current and anticipated future contextual influences;
- highlight aspects of any necessary 'closed system' appraisal methodologies that might be especially vulnerable to 'open system' contextual changes and influences;
- acknowledge, and highlight the (institutional and other) implications of exposing MUTPs to 'open systems' thinking with particular regard to project planning and appraisal;
- seek to identify potential 'winners and losers' (over different time periods and space) using an 'open systems' analysis approach (always acknowledging that it is likely to be difficult to achieve precision);

- place important 'closed systems' analysis approaches and attendant tools (such as CBA) within a wider MCA framework that is also capable of accommodating open system and agent of change thinking;
- constantly scan contextual influences for change and anticipate the impact of this on closed system appraisal methodologies/approaches;
- suggest when 'project freezing' (lock-in) can most properly take place, having regard to (inter alia) anticipated contextual influences and (especially) the outcome of early stakeholder engagement;
- acknowledge, and treat as a meaningful element of the project planning and appraisal process, the need for early and sustained stakeholder engagement – in particular, be 'open' to the ability of stakeholders to identify potentially unknown/unintended consequences of MUTP implementation.
- in preparing plans and appraisals, recognise the likelihood that projects will need to evolve in response to changing contextual influences rather than insisting on a narrow set of fixed objectives at the outset and communicate this to decision-makers;
- prepare for the full engagement of all stakeholders in both the formulation of initial project objectives and in any re-assessment of their continued applicability;
- ensure systems are in place to enable the continuous scanning of contextual influences so as to alert decision-makers of the need for corrective action and also the opportunities afforded by favourable contextual conditions (when the 'planets are correctly aligned'); and
- ensure that project planning and delivery strategies are sufficiently robust and adaptable to accommodate any changes brought about by evolving contextual influences.

Representatives of private sector MUTP stakeholders should:

- acknowledge the frailties associated with solely /primarily adopting a 'closed system' approach to project planning and appraisal;
- in parallel, acknowledge the advantages of an 'open system' approach as a means to identify (and place 'value' on) the wider potential benefits of MUTPs and their attendant spatial/sectoral plans (and also wide potential dis-benefits) to investors and other stakeholders. This will normally mean accepting that there exists a degree of trade-off between the value of adopting and open systems approach and the need for apparent 'certainty' in terms of (for example) forecasting when and how investment decisions are to be made;
- identify shortcomings associated with individual closed system analyses;
- scrutinise public-sector derived MUTP plans and programmes for robustness and adaptability;
- treating MUTPs as open systems at the planning stage, identify contextual influences and potential roles and functions of MUTPs that were hitherto unforeseen; and
- assist in the identification of appropriate points at which projects need to be 'frozen' in order for their implementation to take place.

Other key MUTP stakeholders should (as appropriate):

- disseminate widely the need for MUTPs to be treated as 'open systems' and that typically they are in fact innovation projects (here it should be remembered that the 'success' of innovation projects are built on the rubble of many earlier 'failures');
- adjust and resource education programmes for students and decision-makers to stress the importance of an open system approach;
- scrutinise the degree of transparency associated with open and closed system approaches and identify any aspects/contextual influences that have not hitherto been highlighted;
- encourage debate of open and closed system approaches at different stages in the project lifecycle;

- assist in identifying the consequences of project freezing on impacted communities in particular to determine potential 'winners' and 'losers' (over time/space); and
- identify contextual items that need to be considered in both 'open' and 'closed system' approaches.

7.4 MUTPs as 'organic' phenomena

7.4.1 Overview of action required

MUTPs are seen to be 'organic' phenomena (rather than engineering artefacts) that often need 'time to breathe' (a period of reflection) in their preparation which can present special opportunities that need to be seized and exploited by key decisionmakers.

Given the organic characteristics of MUTP developments and the 'time to breathe' they often require, the long gestation period that is commonly experienced is not necessarily bad, while fast-tracking can prove lethal if insufficient time has been allowed to absorb/deal with the numerous issues they need to address. It is most important, however, that this 'time to breathe' is well managed and not wasted so as to ensure a genuine re-examination of past decisions and future direction involving key MUTP stakeholders.

MUTP planning, appraisal and delivery agents need to acknowledge the evolutionary nature of many/most MUTPs (especially those with clear agent of change roles/functions and impacts), and in so doing:

- recognise that many MUTPs and the plans and programmes they spawn will often need to evolve in response to changing contextual influences that exert themselves over the (often lengthy) project lifecycle;
- this requires frequent, and very deliberate, opportunities to re-assess and debate the very raison d'etre of the project and its attendant plans and programmes in conjunction with all key stakeholders. Such re-assessments should encompass a re-examination (and monitoring) of all key project objectives and introduce the ability to more readily incorporate newly 'emerging objectives' that were hitherto unanticipated but which become the new yardsticks for assessing 'success';
- more carefully manage the 'time to breathe' periods (where they exist) in order to avoid the misuse of resources and missing potentially precious opportunities for beneficial change;
- acknowledge that such opportunities may present themselves when contextual influences are 'right' (i.e., when the 'planets are aligned') to take decisive action thereby making constant context scanning of potential paramount importance.
- similarly, acknowledge that the ability to control every aspect of project planning and delivery is often fundamentally undermined by 'happenstance' (unforeseen circumstances) and that 'crisis management' in response to such circumstances is not only a highly laudable response it also has an expertise that warrants greater appreciation/respect; and
- prepare flexible, robust and adaptable strategies that are able to address and respond to the complexities that MUTPs pose, especially in relation to their interaction with the areas and sectors they impact upon. Such strategies need to acknowledge the seeming 'inevitability' of unexpected occurrences/decisions/outcomes arising from both within and outside the project.

7.4.2 Recommended responses to need for action

Politicians should:

- abandon the notion that the raison d'etre of MUTPs and their attendant 'agent of change' and functional objectives must necessarily be firmly fixed at the outset and thereby embrace the possibilities/opportunities associated with evolutionary (emergent) change(s). This requires politicians to keep an open mind about both the impact of contextual change on MUTP planning and appraisal and also to encourage the involvement of stakeholders in helping to better 'shape' projects;
- conversely, embrace the notion that a 'time to breathe' and attendant period of reflection
 may be required in order to mould project objectives rather than insisting on overly rapid
 (and perhaps damaging) project planning, appraisal and delivery programmes which are
 often, in any case, rather difficult to control with any real degree of precision i.e. to
 'make haste slowly'. Here though, as noted in Section 6 above, much is dependent upon
 the nature of the MUTP in question (in particular, whether such projects are seen to be
 relatively straightforward or involve multiple and complex interactions with the context
 into which they are to be placed);
- engage with key MUTP stakeholders to encourage meaningful re-appraisal of project objectives and impacts during the time allowed for a 'time to breathe'; and
- carefully scrutinise project strategies/proposals for robustness and adaptability to change.

Public sector officials should:

- in preparing plans and appraisals, recognise the likelihood that many MUTPs will need to evolve in response to changing contextual influences rather than insisting on a narrow set of fixed objectives at the outset – and communicate this to decision-makers;
- prepare project planning and appraisal programmes that, where necessary) allow for periods of reflection concerning project objectives and potential impacts – i.e. allowing projects 'time to breathe' where this is seen to be necessary;
- advise decision-makers of the need to call any period of reflection to a close in view of other imperatives (e.g. those associated with favourable contextual conditions) to take action – however, such advice will clearly need to be accompanied by appropriate justification for pressing ahead;
- ensure full engagement of all stakeholders in both the formulation of initial project objectives and in any re-assessment of their continued applicability;
- ensure systems are in place to enable the continuous scanning of contextual influences so as to alert decision-makers of the need for corrective action and also the opportunities afforded by favourable contextual conditions (when the 'planets are correctly aligned'); and
- ensure that project planning and delivery strategies are sufficiently robust and adaptable to accommodate any changes brought about by evolving contextual influences.

Representatives of private sector MUTP stakeholders should:

- in addition to focusing on the specifics of project delivery, to also give due attention to wider roles and opportunities associated with MUTPs that may impact on the project rather than maintaining that 'speed (in the delivery) is everything';
- identify new roles and functions for MUTPs that promote both private and public sector agendas – rather than concentrating primarily on the former;
- share knowledge with the public sector concerning such wider roles drawn from their global expertise (see discussion below); and
- identify areas of concern where the robustness and adaptability of MUTPs and their attendant plans and programmes could be enhanced.

Other key MUTP stakeholders should (as appropriate):

- promote the notion of the need for a time for reflection in project planning and appraisal;
- promote debate in relation to the raison d'etre of projects and identify new roles and functions for MUTPs;
- adjust and resource education programmes for students and decision-makers to stress the importance of treating MUTPs as organic phenomena;
- assist in identifying emergent MUTP roles/functions and the potential impacts of these during periods allowed for reflection/re-appraisal;
- identify areas of project planning and appraisal where unforeseen contextual influences apply;
- scrutinise MUTP plans and programmes for robustness and adaptability in the face of contextual change; and
- assist in identifying potential project winners and losers resulting from project evolution.

7.5 Need for proper framing of MUTPs

7.5.1 Overview of action required

As noted above (Sections 5 and 6), the changing demands placed on MUTPs can make it excruciatingly difficult to judge their successes and failures. This makes it imperative to ensure proper project framing so as to enable their appraisal to be based upon a fair and transparent foundation.

At present, the most common criteria employed for judging project 'success' are those associated with completing projects on time/on budget/as per specifications commonly known as the 'iron triangle' criteria of project management. However, findings from the OMEGA research programme suggests that such criteria are capable of *only* providing a partial (albeit important) basis for such judgements with particular relevance to construction and particular stakeholders.

Moreover, the research suggests that to make a sound judgement about a project's 'success' or 'failure' it is critically important to understand contextual influences that prevailed at the time the MUTP was conceived, planned, appraised and implemented. On top of this it is considered that because many/most projects evolve in some way over time, they need to be treated as dynamic phenomena whereby yesterday's 'failures' can in some instances become tomorrow's 'successes' (and vice versa).

Proper project framing also requires careful thought to be given to the nature and clarity of MUTP visions, goals and objectives. Indeed, the 'lessons' presented in Section 6 suggest that (inter alia):

- there should be a clear early statement of MUTP roles, goals, objectives, key assumptions, appraisal criteria and anticipated impacts which need to be disseminated to (and thoroughly discussed with) impacted key stakeholders;
- however, it should be acknowledged that having such clarity may be positively harmful if this is accompanied by a resistance to change in the face of fluid contextual influences and the consequent need to accommodate emergent objectives; and
- MUTP objectives are often insufficiently developed at the outset in terms of reflecting the degree of spatial/ sectoral impact that they may have.

In addition, OMEGA research programme findings suggest that MUTP stakeholders and stakeholder groups not only have fundamentally different expectations of the roles/functions and impacts of MUTPs (despite the publication of official project objectives) but also that
their perceptions of 'success or failure' are frequently highly individual and may be based on a particular aspect/component of a project or an emotional responses to it. Yet, most stakeholders acknowledge that MUTP objectives (original and emergent) should provide a sound basis on which to appraise the performance and achievements of such projects in a holistic, clear and transparent manner.

In light of the above it is considered that there is a clear need to acknowledge that sound judgement about the 'success' of MUTP planning, appraisal and delivery is more likely to be achieved when projects are presented to key decision-makers in a manner that lays out all of the key financial and non-financial costs and benefits in a transparent way against a policy framework that assists the setting of priorities and makes trade-offs among different project objectives and stakeholder interests - simultaneously highlighting those aspects of the project and strategy that are:

- subject to considerable uncertainty both now and over time due to changing contextual influences;
- dependent upon the parallel implementation of attendant initiatives;
- likely to require short-term decisions so as to 'fix' particularly fundamental strategy components. In parallel, there will be a need to identify those strategy components that may be allowed to evolve over time; and
- responses to particular MUTP stakeholder visions and/or lobbying.

As part of this process it should be acknowledged that the achievement of time, cost and specification of objectives, though important, does not necessarily represent the prime raison d'etre for undertaking the project.

7.5.2 Recommended responses to need for action

Politicians should:

- recognise that project success/failure can, at best, only be partially judged in relation to traditional time, cost and quality criteria and that wider agent of change objectives are of more fundamental importance over time;
- provide leadership in emphasising the importance of 'vision' and the ability of MUTPs to function as 'agents of change' as more important evaluative criteria than traditional time, cost and specification concerns;
- acknowledge the critical importance played by prevailing and future context in determining likely project outcomes and perceptions of success and failure; and
- assess whether presented planning and appraisal information provides a full account of likely short, medium and long-term costs and benefits (financial and non-financial) and whether project plans appear capable of fulfilling project visions having regard to key stakeholder inputs.

Public sector officials should:

- ensure that a full and transparent account of key factors that may potentially lead to
 project 'success' and 'failure' is provided to key MUTP decision-makers. This will need
 to encompass not only 'known/firm' financial and non-financial costs and benefits, but
 also the more speculative outputs from scenario testing, future proofing and exercises to
 identify potential 'winners' and' losers' in an open and transparent way, simultaneously
 highlighting strategic elements/factors that must necessarily remain uncertain;
- similarly, such accounts should acknowledge that many project impacts: occur only in the long-term; are notoriously difficult to discern at the outset as project 'boundaries' will necessarily remain fluid and subject to change; are consequently extremely difficult to quantify;

- 'place' all appropriate project framing information in an appropriate appraisal framework that emphasises the likelihood that traditional time, cost and quality criteria represent an important but only partial measure of success/failure;
- ensure that project objectives (both original and emergent) are properly disseminated and clear and meaningful to all relevant stakeholders;
- advise decision-makers that early project objectives may be subject to change in light of evolving contextual influences; and
- provide decision-makers with a clear statement of the type of sustainability impacts and trade-offs that an MUTP is likely to involve and articulate these in terms of specific actions and expected outcomes- even if these remain somewhat uncertain.

Representatives of private sector MUTP stakeholders should:

- recognise that project 'success' and 'failure' can, *at best,* only be partially judged in relation to traditional time, cost and specification criteria and that wider agent of change objectives are of more fundamental importance over time;
- emphasise the importance of vision and the ability of MUTPs to function as agents of change as more important evaluative criteria;
- assess whether presented planning and appraisal information provides a full account of likely short, medium and long-term costs and benefits (financial and non-financial) and whether project plans appear capable of fulfilling project visions having regard to key stakeholder inputs;
- identify evaluative criteria drawn from project-based experiences in other domestic and international contexts and provide appropriate health warnings about the need to apply such criteria in a context-sensitive manner;
- identify additional/alternative criteria for judging success/failure that resonates widely within the private sector;
- assist in scenario testing and future proofing exercises;
- share knowledge concerning aspects of success and failure gleaned from other projects globally; and
- advise on contextual influences that might otherwise have been overlooked.

Other key MUTP stakeholders should (as appropriate):

- promote debate about the most appropriate criteria that can/should be used in judging project success/failure;
- adjust and resource education programmes for students and decision-makers to stress the importance of the need for the proper framing of MUTPs;
- scrutinise accounts presented to decision-makers concerning project planning and appraisal for transparency;
- promote lesson learning regarding the need for a broader appraisal framework based more on the appropriateness of 'vision' and wider impacts than traditional time, cost and specification criteria;
- assist in scenario testing and future-proofing exercises;
- assist in the identification of potential winners and losers associated with different (MUTP) development scenarios.

7.6 **Context matters' in MUTP planning, appraisal and delivery**

7.6.1 Overview of action required

Context awareness and sensitivity to context on the part of decision-makers is vital for the successful planning, appraisal and delivery of MUTPs.

It is seen from this research that:

- the context of individual decisions and events impacting on MUTP planning appraisal and delivery is essentially unique, and;
- that 'context' embodies many and various dimensions for decision-making (including, culture and societal beliefs/values, time and space, economic circumstances, institutional frameworks and networks and, not least because of its impact on MUTP decisionmaking, political influence).

Faced with this, it is suggested that MUTP planning, appraisal and delivery agents need to acknowledge the importance of:

- undertaking periodic sensitivity analyses of the context(s) of MUTPs over the entire project lifecycle since contextual changes will invariably drive pivotal decisions that affect outcomes;
- context awareness as a key factor in successful decision-making to address the risks, uncertainties and complexities that characterise MUTPs. In particular, key project stakeholders need to identify and analyse the critical contexts (and interdependencies) that surround pivotal project decision making;
- recognising the likelihood (or *perhaps* inevitability) that the constant ebb and flow of context will almost certainly result in the need to adjust MUTP objectives, appraisal methods/approaches and delivery plans and programmes;
- in connection with the above, acknowledging that there are occasions of serendipity in MUTP decision-making when unique opportunities present themselves that must be seized by key stakeholders;
- awareness that 'change' is gathering increasing pace in 21st Century due, among other things, to rapid technological improvements and forces of globalisation;
- acknowledging that 'mega events' may have both positive and negative impacts on the risk, uncertainty and complexity of MUTPs; and
- recognising that the scale, cost and often controversial nature of MUTPs means that political influence/support will remain a critical contextual factor over the entire project lifecycle.

7.6.2 Recommended responses to need for action

- acknowledge that MUTP planning, appraisal and delivery is fundamentally 'vulnerable' to
 prevailing and future contextual conditions and that 'context' (in all its dimensions and
 manifestations) consequently represents the critical influence on pivotal decisions.
 Moreover, decision-makers need to be aware that changes in context over time are not
 only both difficult to discern but very hard to predict thus heightening concerns about
 risk, uncertainty and complexity and the consequent ability to deliver on project
 objectives according to specified 'requirements' (including both time/cost/specification
 and wider agent of change objectives);
- as a corollary, politicians need to accept, and make provision for the likelihood (perhaps inevitability) that early MUTP plans and programmes will need to change in respond to context;
- provide leadership and support in the face of the sorts of controversy that characterise many MUTP planning, appraisal and delivery processes;
- require periodic reports of context scanning exercises undertaken by the public sector over the whole project lifecycle and decide on corrective action where necessary;
- scrutinise the applicability of MUTP planning and appraisal methodologies in light of prevailing and anticipated future contextual conditions;
- similarly, scrutinise that adaptability and robustness of MUTP plans and programmes to accommodate contextual change over time; and

 act upon moments in time when contextual conditions are ripe for decisive action to be taken in respect of current MUTP plans and programmes – including those contextual conditions that accompany 'mega events'.

Public sector officials should:

- as above, acknowledge and take account of the fact that MUTP planning, appraisal and delivery will inevitably be impacted by contextual change, resulting in the need to potentially adjust both project objectives and component plans and programmes;
- prepare and test scenarios that seek to reflect the broadest possible range of future contextual change and highlight the fundamental impacts this may have on MUTP objectives, plans and programmes;
- as a consequence, prepare MUTP plans and programmes that are both robust and adaptable in the face of short, medium and long-term contextual change – insofar as this is possible;
- ensure that appropriate systems are established to scan for the types of contextual change over the whole MUTP lifecycle that are likely to influence pivotal decisions, and regularly communicate the results of such scans to decision-makers together with recommendations concerning the need for corrective action;
- ensure that planning and appraisal methodologies remain appropriate to prevailing and potential future contextual conditions; and
- assist in the identification of contextual conditions that represent opportunities for decisive action/decision-making.

Representatives of private sector MUTP stakeholders should:

- recognise the inevitability of contextual change and its influence on MUTP planning, appraisal and delivery and consequently acknowledge that demands for 'certainty' as a backdrop to critical investment decisions may not be realisable;
- assist in the preparation and testing of future contextual scenarios so as to facilitate the preparation of more robust and adaptable MUTP plans and programmes;
- advise the public sector and politicians of contextual influences (and changes thereto) of which the latter may be unaware but which are likely to have a critical impact on decision-making. This may include, but is not limited to, experiences drawn from MUTP planning appraisal and delivery conducted in other contexts;
- assist in the identification of contextual conditions that represent opportunities for decisive action/decision-making.

Other key MUTP stakeholders should (as appropriate):

- disseminate the need for context awareness on the part of MUTP planning, appraisal and delivery agents;
- adjust and resource education programmes for students and decision-makers to stress the critical importance of context in MUTP planning, appraisal and delivery;
- scrutinise the degree of transparency with which the agent of change debate is carried out, address areas of opaqueness and encourage wider debate of project objectives;
- assist in the preparation and testing of future contextual scenarios to enable the preparation of robust and adaptable MUTP plans and programmes;
- advise the public sector and politicians of contextual influences (and changes thereto) of which the latter may be unaware but which are likely to have a critical impact on decision-making; and
- assist in identifying potential project winners and losers over time, geographically and economically that might result from adjustments to MUTPs brought about by contextual change.

7.7 Role of sustainable development visions in MUTP planning, appraisal and delivery

7.7.1 Overview of action required

The lack of either a clear (and shared) vision of the precise meaning of 'sustainable development' threatens to seriously undermine the potential for MUTPs to make a positive contribution to its achievement.

The lack of clarity and consensus poses a number of critical challenges for MUTP planning, appraisal and delivery, including questions about whether they can effectively meet the needs of intra and inter-generational equity (and socio-economic equity), as well as global concerns about such matters as fuel scarcity and climate change.

What is also readily apparent is that sustainable development visions are *not* presently seen as providing adequate frameworks for either setting MUTP goals and objectives or judging their subsequent success or failure (both for new projects and in relation to the retrofitting needs of existing MUTPs). This is principally due to the perceived difficulties in defining 'sustainability' in an operationally useable manner and by the inherent difficulties that exist in reconciling aspirations associated with the different dimensions of sustainability (environmental – economic – social – institutional) which often are seen to be in conflict in MUTP planning, appraisal and delivery. This also requires much thought to be given to determining what 'weight' should be given to each sustainability dimension (and what trade-offs might be necessary).

The above situation is made even more problematical by the existence of significant institutional/organisational and professional barriers and silos that inhibit the application of 'holistic' sustainable development visions to MUTP planning, appraisal and delivery. Moreover, certain MUTPs (especially road-based MUTPs) are characterised by an inbuilt conflict between (particularly) concerns for environmental sustainability and the manner in which they are funded – given that their continued financial sustainability is frequently highly dependent on revenues that fundamentally require ever increasing patronage levels which in turn provide government with sources of revenue (directly or indirectly).

7.7.2 Recommended responses to the need for action

- provide leadership in promoting discussion and debate about both: the role that MUTPs and their attendant agent of change functions can play in relation to sustainable development visions, and; the means by which such visions can be translated into a form that is not only clear and meaningful to all key stakeholders but also capable of being readily operationalised;
- acknowledge that sustainable development visions need to embody not just environmental concerns but also those associated with the dimensions of economic sustainability, social sustainability and institutional sustainability since, together, these four components are mutually reinforcing;
- that said, there is also a need to acknowledge that individual MUTP proposals may well
 result in conflicts between the different dimensions of sustainability and politicians will
 likely be called upon to arbitrate any trade-offs between them;
- ensure that MUTPs are provided with the type of institutional, policy and legal framework that will enable them to promote sustainable development visions (see below);

- demand the removal of organisational and professional silos that frustrate the type of holistic approach to MUTP planning, appraisal and delivery that the fulfilment of sustainable development visions requires from all public sector bodies;
- scrutinise the role of individual MUTPs within an overall sustainable development framework prepared by the public sector (see below) to determine its sustainability credentials relative to other possible strategies (including, but not limited to, the use of alternative modes and/or technologies, alternative territorial and sectoral restructuring strategies and a 'do nothing' approach). This may well include determining whether an individual MUTP has been promoted solely as a means to facilitate continued growth in mobility.

Public sector officials should:

- promote debate and discussion amongst all stakeholders about: the aims and components of sustainable development visions and most especially the role of MUTPs therein, and; ways in which such visions might be made readily understandable and capable of operationalisation so as to facilitate enhanced decision-making;
- advise decision-makers in regard to systems and processes that will facilitate the reconciliation of conflicts between the different dimensions of sustainability – by identifying where and when trade-offs between these dimensions might be necessary and by advising the relative weights that should be accorded to each dimension under different contextual scenarios;
- within the framework of an overall sustainable development policy, prepare MUTP plans and programmes that do not simply facilitate travel but seek to harness their agent of change capabilities for territorial and sectoral restructuring in accordance with agreed visions; and
- prepare and implement organisational change within the public sector so as to enhance its capability to adopt a truly holistic approach to MUTP planning, appraisal and delivery based upon the four key dimensions of sustainability mentioned above.

Representatives of private sector MUTP stakeholders should:

- assist in the debate and discussion about concerning sustainable development visions with a view to identifying the critical roles that MUTPs and their attendant agent of change capabilities can play in this respect;
- most importantly, advise public sector organisations and politicians on ways in which to
 operationalise MUTP objectives/deliverables in a way that reflects the broader visions of
 sustainable development; and
- advise the public sector where, based on previous experiences either internationally or domestically, conflicts between sustainability dimensions are likely to occur and how strategies might be developed to resolve such conflicts.

Other key MUTP stakeholders should (as appropriate):

- disseminate the need for discussion and debate concerning the role of MUTPs in delivering sustainable development visions;
- adjust and resource education programmes for students and decision-makers to stress the critical importance of the need for a truly holistic approach to MUTP planning, appraisal and delivery that lends itself to adequate consideration of the multiple dimensions of sustainability;
- scrutinise individual MUTP proposals to determine their appropriateness relative to agreed sustainable development visions;
- advise on the existence and nature of any conflicts between the different dimensions of sustainability.

7.8 Engaging with MUTP stakeholders

7.8.1 Overview of action required

Effective engagement with key stakeholders is seen as a critical activity in MUTP planning, appraisal and delivery as this presents important opportunities to manage/mitigate risk, uncertainty and complexity (in general) and more specifically to assist in the adjustment project objectives so as to address manifold contextual influences (and changes thereto), manage expectations and help progress the project delivery process.

It is very clear that discerning and analysing key stakeholder motives/agendas and levels of influence on MUTP planning, appraisal and delivery is *never* easy – not least because they are also subject to change over time. This is compounded by the likelihood that relationships amongst and between stakeholders will also change over the MUTP lifecycle. As a result, there is a need for MUTP planning and delivery agents to undertake frequent scans of the stakeholder environment in order to assess the willingness, ability and capacity of different groups and networks to exert critical influence on pivotal decisions.

Building relations with key stakeholders is also dependent upon the establishment of trust, credibility and transparency – which in turn, represent important factors in creating consensus. Indeed, it is suggested that consensus-building at the preliminary stages of the planning and appraisal stages of MUTPs is essential for the reasons given above. As a corollary, MUTP planning and delivery agents will also need to identify those pivotal decisions which require a high level of trust to be established.

What is also readily apparent here is that there is a strong relationship between trust and transparency – more opaque decision-making processes are rarely trusted by those key stakeholders who are not directly involved therein. Thus, access by key stakeholders to all relevant, high quality, information is seen as critically important. It is acknowledged here that are usually limits to full disclosure as a result of legitimate commercial sensitivities - despite increasing demands for access to such information. This latter point requires MUTP planning and delivery agents to take a carefully considered view as to how much 'sensitive' information can be released.

7.8.2 Recommended responses to the need for action

- acknowledge that early and sustained stakeholder engagement represents is a positive benefit to MUTP, planning, appraisal and delivery but that discerning and understanding actual stakeholder motives and agendas is never easy;
- ensure that stakeholder engagement programmes prepared by the public and private sectors are both sustained over the MUTP lifecycle and make provision for genuine debate and the two-way exchange of information;
- building trust and consensus with stakeholders also needs to be recognised as a key activity and that this has to be based on a track record of trustworthiness, reliability and transparency in approaches to decision-making;
- of utmost importance is the need for politicians to identify those pivotal MUTP decisions that require the prior establishment of high levels of trust;

 require the preparation of regular reports of scans undertaken by the public sector in regard to the ability and willingness of key stakeholders to influence MUTP decisionmaking.

Public sector officials should:

- prepare MUTP programmes that will enable regular and sustained engagement with stakeholders over the whole MUTP lifecycle and make provision for: genuine debate concerning the raison d'etre of the project and its attendant objectives; alternative plans and strategies; project appraisal frameworks; the assessment of winners and losers, and; the full two-way dissemination and disclosure of relevant, up-to-date information;
- as above, building trust and consensus with stakeholders also needs to be recognised as a key activity and that this has to be based on a track record of trustworthiness, reliability and transparency in approaches to decision-making;
- advise politicians of key MUTP decisions that require the prior establishment of high levels of trust due to their potentially critical impact on planning, appraisal and delivery; and
- prepare systems and processes for the regular scanning of the stakeholder environment, identifying (wherever possible) the positions taken by key players and their potential influence in regard to decision-making, and to report the same to decision-makers.

Representatives of private sector MUTP stakeholders should:

- as above, prepare programmes that will enable regular and sustained stakeholder engagement over the whole project lifecycle; and
- acknowledge the need for building trust and consensus with stakeholders.

Other key MUTP stakeholders should (as appropriate):

- disseminate the need early and sustained stakeholder engagement throughout the MUTP lifecycle;
- adjust and resource education programmes for students and decision-makers to stress the critical importance of the need for full stakeholder engagement in MUTP planning, appraisal and delivery processes and reinforcing the need to establish trust based on appropriate levels of transparency; and
- scrutinise engagement programmes to determine whether they permit the genuine involvement of stakeholders over the whole project lifecycle and allow for the transparent sharing of information and views.

7.9 Need for full institutional, policy and legislative support

7.9.1 Overview of action required

MUTPs are unlikely to be able to deliver the full range of agent of change benefits unless accompanied by a suitable institutional, policy and legislative framework.

Whether such a framework is bespoke or represents an adaptation/extension of currently available institutional, policy or legislative arrangements, it is *critically* important that it is sustainable over the medium-long term (which is too often *not* the case).

Another key characteristic is the ability of frameworks under which MUTPs are planned, appraised and delivered to address:

• the wide-ranging variety of expectations and aspirations that such projects inevitably engender; and

• the multiple territorial, sectoral and stakeholder interfaces with which the planning, appraisal and delivery processes have to deal.

These frameworks will usually require the sustained support of a political champion (or champions), capable of maintaining momentum, building consensus and reconciling conflicting/competing stakeholder agendas.

Failure in any of the above respects is likely to lead (at best) to increased risk uncertainty and complexity surrounding MUTP planning, appraisal and delivery, and at worst to an almost complete inability to deliver on objectives that express agent of change aspirations/expectations.

7.9.2 Recommended responses to the need for action

Politicians should:

- scrutinise all MUTP proposals with a view to ensuring that they are properly equipped with appropriate institutional, policy and legislative support capable of both delivering on traditional time, cost and specification objectives, and maximising the beneficial agent of change impacts that such projects can produce;
- in particular, identify any gaps in proposed institutional arrangements that need to be filled (whether such arrangements are bespoke or comprise an amended form of existing institutions and organisations) and examine their ability to be sustainable over the medium-long term – especially crucial for MUTPs with proposed/anticipated agent of change roles and functions; and
- provide leadership in steering MUTPs through the planning, appraisal and delivery
 process in consultation with all key stakeholders taking full account of critical
 contextual influences that emerge over time and the consequent need for possible
 adjustment to project objectives. Here, project champions will undoubtedly continue to
 play a key role in reconcile the need to maintain an open system approach during the
 planning and appraisal period, whilst simultaneously sustaining momentum.

Public sector officials should:

- prepare an institutional, policy and legislative framework (where such a framework does not already exist, or has significant gaps) that is capable of supporting both project planning, appraisal and delivery and the wider agent of change capability of MUTPs in discussion with decision-makers and other key stakeholders;
- ensure that such frameworks are thoroughly stress-tested against proposed/actual project objectives and for their sustainability of the medium – long term; and
- monitor institutional, policy and legislative frameworks to determine their continued efficacy in the face of changing contextual influences and/or adjusted project objectives and suggest necessary changes to decision-makers.

Representatives of private sector MUTP stakeholders should:

- advise on the capability of proposed institutional, policy and legislative frameworks to deliver on MUTP objectives (including, or perhaps especially, those associated with agent of change functions) over the short, medium and long-term; and
- draw on MUTP experiences in other domestic and international contexts to identify potential institutional gaps and any issues which raise doubts about the medium-long term sustainability of proposed frameworks.

Other key MUTP stakeholders should (as appropriate):

 disseminate the need for the establishment and maintenance of sustainable institutional and policy frameworks;

- adjust and resource education programmes for students and decision-makers to emphasise the need for MUTPs to be accompanied by clearly thought-out institutional, policy and legislative frameworks; and
- scrutinise the capability of proposed institutional, policy and legislative frameworks to adequately support MUTP planning, appraisal and delivery and to be sustainable over the medium – long term.

7.10 Lesson learning and sharing is critically important

7.10.1 Overview of action required

It is readily apparent that widespread lesson learning and sharing is not currently a significant feature of MUTP planning, appraisal and delivery – there are very few examples of post-project evaluation that go beyond simple time/cost/specification assessments of project performance. Furthermore, there is evidence that knowledge acquired by the private sector in the field of MUTP developments is jealously guarded for commercially competive gain, often at the expense of the public purse. Yet, the OMEGA research indicates that more extensive lessonlearning and sharing derived project experiences can be most valuable if correctly applied (i.e. in a context-sensitive manner) and placed in the public domain for all to benefit.

Notwithstanding the above, evidence suggests that lesson leaning is a matter which is treated most seriously by the private sector in that key project experiences exchanged within organisations – such lessons are often treated as a saleable commodity and are thus not widely shared. To an extent, the same may be true of the public sector, but it is doubtful here that many formal mechanisms exist to enable proper lesson learning and sharing beyond the exchange of anecdotal evidence by involved personnel. What is most important to recognise is that there appears to be almost no sharing of experiences between sectors. This both decreases the potential for the application of new innovations and deprives both sectors of the ability to capitalise on past experiences.

It is therefore considered that project-based lesson-learning and sharing ought to be integrated into MUTP decision-making through the introduction of systems that are capable of disseminating all lessons (whether positive or negative) that have been learned by the full spectrum of stakeholders throughout the project lifecycle. The aim here should be to build-up a knowledge base extracted from case histories that reflect 'good practice' that will enable MUTP decision-makers to better address risk, uncertainty and complexity, and the influence of context.

7.10.2 Recommended responses to need for action

- acknowledge the need to establish proper systems and processes for the sharing of project experiences between all sectors;
- require such lesson learning and sharing to be based on the full range of project outcomes over the short, medium and long-term (rather than simply whether time, cost and specification objectives have been met), particularly emphasising the agent of change capabilities and impacts of MUTPs;

- ensure that knowledge gleaned from lesson learning activities does not remain within sectoral, organisational or professional silos;
- require regular reports of the full range of MUTP outcomes/experiences postimplementation; and
- identify whether there is actual learning taking place as a result of the sharing of project experiences by reference to the quality of subsequent proposals put forward for the planning, appraisal and delivery of MUTPs.

Public sector officials should:

- prepare systems and processes that will enable full disclosure of *all* project experiences and lessons based thereon (whether negative or positive) to be placed in the public realm. As above, such lessons and experiences should encompass both 'traditional' evaluation criteria and those associated with wider agent of change impacts';
- advise where such lessons are likely to be especially sensitive to context; and
- prepare regular reports on the above for decision-makers so as to enhance future MUTP planning, appraisal and delivery.

Representatives of private sector MUTP stakeholders should:

 share project experiences and lessons drawn from domestic and international MUTP planning, appraisal and delivery rather than treating such knowledge as confidential, saleable commodity.

Other MUTP key stakeholders should (as appropriate):

- disseminate the need for thorough examination of all project outcomes and the identification of lessons that can be drawn from these;
- adjust and resource education programmes for students and decision-makers to stress the critical importance of lesson learning and sharing;
- scrutinise lesson learning and sharing exercises to ensure that organisational, sectoral and professional silos are not permitted to hoard information that should be more widely disseminated; and
- assist in the identification of the extent to which real progress is being made by the public and private sectors in relation to the quality of MUTP plans, appraisal methodologies and delivery systems as a result of lesson learning and sharing.

8. Next steps: Dissemination of study findings

8.1 Introduction

As already mentioned in Volume 1, to help achieve the overall goals of the OMEGA Centre, it has developed a ('making a difference') strategy which seeks to disseminate the findings of its five year research programme in a variety of ways to a variety of audiences' world-wide. This strategy looks to placing the Centre's research outputs firmly and visibly in the domain of MUTP practitioners and decision-makers, as well as academia, with a view to promoting and enhancing professional practice and academic research in the field of MUTP development internationally. To assist in this task, in 2009 the CoE identified a matrix of potential stakeholder groups considered to be suitable audiences along with potential avenues to influence with targeted sets of stakeholder lessons and guidelines. This 'making a difference' matrix strategy is summarized in Table 8.1.

How the Centre's dissemination strategy relates to the three key areas of activity - namely to academic research, academic education, and professional capacity building - will be expanded on below. The discussion which follows outlines the work that the OMEGA Centre has completed to date within each key area, whilst Section 8.2 introduces the initiatives the OMEGA Centre plans for the future in the execution of its strategy.

8.2 Academic research dissemination

The principal achievements of the Centre to date in the implementation of its 'making a difference strategy' dissemination strategy includes:

- The formation of a global network of academics and professionals committed to developing and sharing new knowledge that is especially relevant to 21st Century MUTP planning, appraisal and delivery. This global 'OMEGA Partner Network' (see Appendix 6) comprises an extensive international group of key stakeholders in the public and private sectors who have not only been contributors to the research programme but are also involved in raising the awareness of the Study, its methods and publications, and the findings that have emerged.
- The development of the OMEGA website, the OMEGA International Partnership Network and the VREF PhD Network (see Appendix 7 and 8, respectively) which has created an international platform for the discussion, analysis and dissemination of issues and ideas related to the research programme. The platform has been expanded to permit PhD students from *all* VREF CoEs to access the OMEGA *moodle* Collaboration Tools. Post-2011, it is proposed that this activity is pursued further with the formation of OMEGA Virtual Working Groups to, for example, help develop and disseminate lessons and guidelines on MUTP development and sustainability and MUTP retrofitting two areas identified by the OMEGA research programme as especially requiring further research and development. The OMEGA website is also to be made accessible to interested outside parties/bodies to keep track of the various issues, interests and research outputs that the Network is producing.
- The OMEGA Centre has established an in-house UCL seminar series where renowned external speakers present on topics related to mega infrastructure investments and their impacts on development (see Appendix 11). The series is now in its fourth year and has hosted talks which attract a regular audience of academics and practitioners from throughout London and the South East.
- The use of the CoE website to post all OMEGA 2 Project deliverables as they are produced, including the various OMEGA Workshop proceedings, the planned International Conference Proceedings together with their and related audio-visual files

Table 8.1: The	OMEGA	'Making a	a Difference'	Matrix
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Stakeholder Type	Stakeholder Interest in OMEGA Research	Omega value added	Research Output Type(s)	Research Output Format(s)	Accompanying Activity(ies)	OMEGA Existing Outputs
Academic Research	 Establishment of global databank on MUTPs Establishment of global collaborative partnership network in MUTP research Access to OMEGA findings as foundation for further research 	 Access to data Access to expertise Access to findings 	 Published Research Unpublished research 	 Edited & authored books Academic Journals Website Material OMEGA Working Papers 	 Conference presentations Seminar Presentations In-house organisation presentations 	 Working Papers Published articles
Academic education (PhD student Programme)	 Research into new knowledge, methods, tools and techniques re: MUTP planning, appraisal & delivery 	 3 PhD students at UCL 7 other PhD students in other OMEGA Partner institutions 	 PhD theses Published Research Unpublished research 	 Academic Journals Website Material OMEGA Working Papers 		Draft PhD these
Academic education (MSc Student programme)	 Acquisition of latest knowledge, methods, tools and techniques to enhance skill set derived from OMEGA research Access to case study materials/knowledge from practitioner contributions 	 New case study teaching material resources New OMEGA Seminar Programme 	 New MSc Programme at UCL Contribution of modules to other MSc programmes at UCL 	Case StudiesText BooksWebsite Material	Teaching both conventional and web-based	Teaching materialsBibliographies
Professional accredited development programmes for Consultants	 Enhance chances of winning competitive business Insights into international insights into MUTP decision maker thinking Access to OMEGA Methodologies 	 Access to global MUTP databases Acquisition of expertise in selected MUTP topics in planning, appraisal & delivery Access to expertise in new methods of decision-making in MUTP planning, appraisal & delivery 	 Collaboration Consultancy 	 MUTP Tender Document amendments Website Material 	 Working Groups Project teams Consortia Workshops Consultancy assignments 	 Under discussion
Professional accredited development programmes for Government Departments & Local Authorities Including: • Infrastructure Planning Commission (IPC) • Regional Development Authorities	 Capacity building in MUTP planning, appraisal and delivery Access to OMEGA Methodologies 	 Track record Credibility Access to Data Expertise in topic Expertise in methods Reduced uncertainty Methodology 	 Collaboration Consultancy 	Website Material	 Working Groups Presentations Workshops Consultancy assignments 	 Planning White Paper ICE Defending Critical Infrastructure inquiry (underway) IPC capacity building contribution (May 2010) SEEDA capacity building(underway) TfL capacity building contribution (May'10)
Professional accredited development programmes for NGOs	 Capacity building in MUTP planning, appraisal and delivery Access to OMEGA Methodologies 	 Access to Data Expertise in topic Expertise in methods Reduced uncertainty Methodology 229 	CollaborationConsultancy	Short CoursesLeafletsWebsite Material	 Working Groups Presentations Workshops Consultancy assignments 	Collaboration with UITP (Heather Allen) (underway)

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- and both Country Synthesis Reports and the Final Reports of the full Research Programme.
- The delivery of twenty Working Papers (WP Series #1 and #2) (see Appendix 12). The first series of these WPs offer an analysis and critique of the national policy, planning and funding frameworks since the Second World War for MUTPs in each of the case study countries. The second series offers an examination of selected thematic sustainable development challenges encountered internationally by MUTPs looking both retrospectively and ahead. This latter set of WPs makes a significant contribution to efforts at operationalising the concept of sustainability in the context of MUTP developments thus helping to reduce the ambiguity often associated with the term 'sustainability' and its application to mega project decision-making;
- The undertaking collaborative research with the UK Institution of Civil Engineers and Actuary Profession in establishing how to incorporate social and environmental dimensions of sustainable development into the appraisal of major infrastructure projects which led to a Seminar at the Institution of Civil Engineers with key experts within the field, a significant contribution to be incorporated into the next edition of the Institutions RAMP handbook on project management.
- The delivery of a significant number of invited talks, seminars, national and international conferences papers reporting on the CoEs findings. Since 2010 these have included contributions to:
 - The World Future Energy Summit, Abu Dhabi, January, 2010
 - The London Thames Gateway Partnership, London, March, 2010
 - US Department of Transportation and University of Pennsylvania (a Fast Train Deputation to London), London, March 2010
 - Middle Eastern and North African (MENA) Transportation Infrastructure Association Conference, Abu Dhabi, May 2010
 - The Infrastructure Planning Commission, Bristol, May 2010
 - Transport for London (TfL), London, May 2010
 - China Planning Network Conference (CPN), Beijing, June 2010
 - World Conference for Transportation Research (WCTR) Conference, OMEGA Special Session on MUTPs, Lisbon, July, 2010
 - The European Investment Bank, Luxembourg, September 2010
 - United Nations-Habitat Workshop, Mombasa, November 2010
 - UK Independent Planning Commission (Seminar) September 2010
 - VEF CoE Conference, Nairobi, December 2010
 - o UCL Infrastructure Planning and Delivery Seminar, April 2011
 - Association of European Schools of Planning Conference, OMEGA Special Session on MUTPs, Perth, July 2011
 - Complex Projects: Legal Risk Management, Contracts, and Insurance. Samrisk Seminar, Norwegian Business School, Oslo, August 2011

A full list of such contributions by the OMEGA Network is incorporated in Appendix 14.

8.3 Academic education programmes

Listed below are the principal achievements the OMEGA Centre has made to date towards academic education programmes:

- the initiation and development of a global network and related knowledge platform of new PhD research as part of the OMEGA International Partner teams producing in the next 12 months a total of 10 PhD graduates all largely funded by the CoE grant but also supported by local stakeholder/university contributions. This is believed to represent a key investment in capacity building for future MUTP policy makers/influencers and practitioners (see Appendix 8);
- the introduction/launch of a new international UCL MSc Programme in Mega Infrastructure Planning, Appraisal and Delivery developed and designed largely on the basis of the findings of the Centre's research programme. The approved MSc

programme (see Appendix 27) has been launched by the Bartlett School of Planning, UCL in September 2011 for which 14 students have enrolled from ten countries and four continents. Again, knowledge dissemination through this MSc programme will help build capacity among attending students and those that they subsequently engage with in practice;

- the introduction of new specialisms in mega infrastructure planning, appraisal and delivery in existing UCL MSc Programmes in the Bartlett School of Planning, Development Planning Unit (DPU), Department of Geography and Department of Civil, Environmental and Geomatic Engineering. The new specialism is scheduled to commence in September 2011 with an as yet unspecified number of students; and
- the provision of advice in the possible development of new MSc programme overseas in infrastructure planning at the Department of Civil Engineering at the University of Auckland, New Zealand.

8.4 **Professional capacity building**

The OMEGA Centre has to date had several levels of impact on local and international capacity building in the planning, appraisal and delivery of MUTPs. It has, furthermore, held numerous discussions with various international and local professional bodies regarding the role the Centre could play in capacity building in the field of mega infrastructure development. These impacts/initiatives include:

- The building and enhancement of a global capacity of expertise in MUTP developments imbedded in ten universities world-wide. As part of the OMEGA research programme this involved some 40 researchers, largely funded by the VREF CoE grant but also supported by local stakeholder/university contributions. Through lesson sharing and education programmes these researchers are helping build (and spread) capacity in relation to the new knowledge being generated by the OMEGA research programme.
- The dissemination of OMEGA research findings through contributions made by the Director of the OMEGA Centre to the new on-line World Bank Institute (WBI) course on Infrastructure and Land Use Planning and also on Sustainable Urban Land Use Planning, providing module material for courses which first came on-line in May 2010.
- The dissemination of OMEGA research findings through contributions made by the Director of the OMEGA Centre to the UN-Habitat's preparation of its Global Report on Human Settlements which is to focus on sustainable urban mobility.
- The possible development with the World Bank Institute (WBI) of on-line programmes and short courses prepared by the OMEGA Centre (in association with industry) on mega transport infrastructure planning, appraisal and delivery.
- The possible development of on-the-job/project-related capacity building initiatives in the planning, appraisal and delivery of mega infrastructure projects, especially transportation projects for the World Bank and the Inter-American Development Bank.
- The launch of OMEGA Centre short executive (CPD) courses at UCL in UK for industry, government and commerce in the field of mega infrastructure planning, appraisal and delivery with the Institution of Civil Engineers, the Royal Town Planning Institute and numerous consultancy firms.
- The launch of OMEGA Centre short executive (CPD) courses overseas for industry, government and commerce in the field of mega infrastructure planning, appraisal and delivery in association with other VREF CoEs. To date, the VREF CoEs in Santiago, Chile; Cape Town, South Africa; Beijing, PRC; Delhi, India and Berkeley, USA have all expressed an in principle interest in collaborating in future research and capacity building activities in MUTP developments with the OMEGA Centre.

• The OMEGA Centre has to date been approached regarding its research findings by: the London Olympics Delivery Agency, Cross-Rail Ltd, UK Planning Infrastructure Commission, Steer Davis & Gleave, London Thames Gateway Partnership, US Department of Transportation, the Abu Dhabi Planning Commission, Auckland City Unitary Authority, Tainan Metropolitan Authority and Australian Smart Infrastructure Centre.

8.5 Academic publishing

The future strategic direction of the OMEGA Centre requires the CoE to now move its focus strongly towards the publication and dissemination of the knowledge it has accrued over the life of the OMEGA research programme to date. The OMEGA Centre has in place a post 2011 publication programme for the period January 2012 through to December 2013 (inclusive) which subject to funding support includes the following aims:

- The preparation of an OMEGA Study Executive Summary (early 2012)
- The preparation/publication of journal articles unsolicited invitations to H.T. Dimitriou, P. Wright and E.J. Ward for 2012 have been received from:
 - *Progress in Planning Journal* for a 'Comparative International Review of Decisionmaking in the Planning of Mega Urban Transport Projects'; and
 - *Risk Analysis Journal* on two themes: 'Complex Projects and the Treatment of Risk, Uncertainty and Complexity: A review of interdisciplinary lessons' and on 'Complex Projects: Lessons in decision making from the planning of UK Mega Urban Transport Projects'.
- The preparation/publication of books:
 - Treatment of Risk, Uncertainty and Complexity in Decision-making: Interdisciplinary and multi-professional lessons for planning Mega Projects edited by N. Karadimitriou, H.T. Dimitriou and E.J. Ward with chapter contributions from OMEGA Associates (end 2012)
 - *Mega Project Planning Decision-making: Beyond the Iron Triangle* by H.T. Dimitriou, P. Wright and E.J. Ward (end 2012)
 - A Handbook on Mega Project Planning, Appraisal and Delivery: OMEGA lessons and guidelines by H.T. Dimitriou, P. Wright and E.J. Ward (end 2013)
 - Mega Project Planning: Case study narratives about international experiences edited by H.T. Dimitriou, P. Wright and E.J. Ward with chapter contributions from OMEGA Partners (end of 2013)
 - Mega Projects and Sustainable Development: Visions and challenges for the 21st century edited by M.K. Ng, N. Low and H.T. Dimitriou with chapter contributions from OMEGA Partners (end of 2013)
 - National Policy, Planning and Funding Frameworks for Mega Projects: An *international comparative study* edited by R. Gallagher and P. Wright with chapter contributions from OMEGA Partners (end of 2013).

Regarding the proposed book publication programme, discussions are currently underway with Earthscan-Routledge with a view to publishing the above books (based on existing/updated OMEGA material) within an OMEGA Series on Mega Projects. It is anticipated that contracts will be drawn up by the end of this year. Please note that the dates in brackets shown above are dates for the submission of book manuscripts *not* publication. Publication dates are typically six-nine months later.

Regarding journal article publications, in light of the rather heavy book publication programme given, and in light of the restricted resources available, it is anticipated that each

of the OMEGA Centre Team members will confine themselves to two single authored articles or four co-authored articles per year.

8.6 Future research prospects and priorities

The Centre plans to use the OMEGA research programme findings to maintain links with the OMEGA Partner Network and investigate the funding for a series of new initiatives. The Centre is also actively seeking to establish collaboration with other groups within UCL for future collaborative research and has formed a close relationship with the UCL Department of Civil Environmental and Geomatic Engineering and the Development Planning Unit (DPU).

The extensive international MUTP project profile database put in place by the OMEGA Centre and its Partners, and hosted on the OMEGA Centre's website, is one of the most indepth data base/information resources of its kind. This currently charts the planning, appraisal and delivery of 30 case studies world-wide. In the next five years the CoE aims to maintain and expand this resource base for use both within and outside the academic community. The database provides an especially robust resource for capacity-building of PhD students by the OMEGA Centre and elsewhere and offers opportunities for further future collaborative research internationally - especially with other CoEs.

In consort with its MSc programme teaching, PhD supervision and on-going research/consultancy work, a critically important part of the OMEGA Centre's development is (as mentioned earlier) the provision of CPDs for industry, commerce, government and the built environment professions, both in London (at UCL) and overseas (especially in association with other VREF CoEs). In total The OMEGA Centre plans to offer four CPDs per year, on two different principle themes:

- Mega Project Planning, Appraisal and Delivery, and
- Urban Transport Policy and Planning for Developing Countries.

The teaching material for the former will be primarily derived from modules from the OMEGA MSc Programme in Mega Infrastructure Planning, Appraisal and Delivery, while the teaching materials for the latter are to be based on the recent advisory work undertaken by the Director of the OMEGA Centre for UN-Habitat on sustainable urban transport for developing countries.

These CPDs will be targeted towards mid/senior career personnel. As already indicated, discussions are currently underway to investigate the possibility of running these courses in association with other VREF CoE centres. The courses are expected to be especially attractive to parties from commerce and industry and from international development agency funded projects since they will: enhance their chances of winning competitive business in the field of urban transport in developing countries; give new invaluable international insights into MUTP decision-maker thinking; and provide access to innovative OMEGA research and appraisal methodologies as well as network internationally on these topics. Both major themes of these CPDs are areas internationally recognised to be in critical need of further capacity-building.

Beyond the CPDs, the CoE aims to offer advisory-cum-consultancy services to public, private and international development parties involved in and/or impacted by mega infrastructure developments and urban transport in developing countries through contract research and consultancy, working wherever possible in collaboration with the Centre's VREF Partners and in association with the consultancy firms with which the OMEGA Centre has to date built a close relationship.