

Planning mega transport projects: emerging lessons & challenges for China

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CHINA'S APPETITE FOR MEGA TRANSPORT PROJECTS

- China's current appetite for mega transport projects (MTPs) seems insatiable, and from its development plans, long term. This is unsurprising given the country's past limited investment in transport infrastructure and its recent phenomenal economic growth, fast motorisation and urbanisation rates, widespread modernisation efforts and surging levels of traffic in freight and people.
- Major Chinese port, airport, railway and road projects have all drawn the attention of large institutional investors both locally and globally for although many such projects rely initially on public funding, governments are looking to raise funds from outside the public sector, including from stock markets^[1] to build, operate and manage such projects.
- A recent London seminar on global infrastructure investment^[2] indicated that many global investors, awash with rich pickings^[3], have set-up new infrastructure funds which are looking to attract annual investment returns of at least 8 per annum and as much as 30% are increasingly targeting 'emerging markets', especially China.

^[1] According to *Asian Infrastructure*, Issue 148, June, London (2007) this interest has been spurred by the massive surges in stock prices on the Greater China bourse.

^[2] Euromoney Seminar: *Infrastructure finance and investment summit*, sponsored by the Royal Bank of Canada Capital Markets, The Dorchester, London, 26-27th June, 2007

^[3] This same source revealed that the value of infrastructure deals undertaken by these institutions soared to US\$ 145 billion world-wide last year (2006),

Planning mega transportation projects: emerging lessons and challenges for China – Harry T. Dimitriou

- The continued increase in the number and complexity of MTPs in China may be appreciated by quickly summarising some of these projects (after *Asian Infrastructure*, 2007):
 - **Recent/pending port projects**
 - Investment programme to create an eight-berth terminal at Qingda
 - US\$1.29 billion new investment in the Qiongbai area of Haiku port.
 - Modernization programme of the Fuzhou Port.
 - US\$ 94 million investment Xiamen International Port has announced plans for a joint venture with Hutchinson Port Holdings to invest in a terminal in Xiamen's Haicong Port costing US\$ 94 million.
 - Proposals to spend US\$1.29 billion on infrastructure construction at the port in north eastern China's Liaoning Province.
 - **Recent/pending rail projects:**
 - Shanghai will complete its new No7 subway in two years time.
 - The ministry of Railways has launched its programme of bullet train services.
 - The Shanghai – Pudong Maglev link.
 - Three new rail lines costing US\$2.16 billion in north-western China's Xinjiang Uygur autonomous region.
 - Second phase of Wuhan rail line at a cost of US\$ 500 million.
 - Newly developed light rail transit system in Tianjin Economic Technological Area.

Planning mega transportation projects: emerging lessons and challenges for China – Harry T. Dimitriou

■ Recent/pending airport projects:

- Proposal to build/upgrade a group of airports in Yangtze Delta.
- Second phase of the expansion of Shanghai Pudong International Airport.
- Plan to build international airfreight hub at Shanghai's Pudong International Airport.
- Proposal to develop a north-east Asia air cargo hub in Shanghai.

■ Recent/pending road, bridge & tunnel projects:

- Second phase of Changle – Fuzhou international airport link road at a cost of US\$ 694 million.
- Proposed road tunnel under the bay at Dalian in northern China.
- World Bank Hunan Road Development Project phase IV.

THE WORK OF OMEGA CENTRE AT UNIVERSITY COLLEGE LONDON

■ Background

- In December 2005 University College London (UCL) was awarded research grant valued at SEK 25 million (approx. £2m over 5 years) to set up a Global Centre of Excellence in Mega Projects in Transport and Development at UCL funded by the Volvo Research and Education Foundations (VREF) to undertake an international comparative study of some 30 mega urban transport projects (MUTPs)^[1] in ten countries in Europe, USA and Australasia in association with nine world-wide university partners (see www.omegacentre.bartlett.ucl.ac.uk) and Cognitive Edge Ltd.

[1] MUTPs here refer to transportation projects that cost a minimum of US\$ 500 million (at 1990 rates) and which are either constructed in urban/metropolitan regions and/or which impact on such areas significantly.

Planning mega transportation projects: emerging lessons and challenges for China – Harry T. Dimitriou

- The centre commenced operation in October 2006 and has as its overall aims to establish both generic and context-specific lessons for future MUTP as to:
 - What constitutes a ‘successful MUTP?’
 - How well has risk, uncertainty and complexity been treated in the planning, appraisal and evaluation of such projects?
 - How important is context in making judgements regarding the above questions?

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■ **The importance of context**

- Drawing from a preceding study, again funded by VREF, of the treatment of risk, uncertainty and complexity in decision-making in a variety of disciplines, professions and sectors where coping with risk, uncertainty and complexity has long-time been at the *milieu* of planning exercises, it is very apparent that understanding context is a vital factor in how risk, uncertainty and complexity are (and can be) treated. Here, context refers to the dimensions of:

- Time
- Place
- Economics
- Society
- Culture
- Ideology/policy

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- **Clarification of research questions**
 - Currently ten months into the research programme, it has become clear that a number of questions require clarification in order to address the research programme aims, namely:
 - What exactly constitutes a MUTP, what are its boundaries and typologies?
 - What stakeholder perspectives of judgement are to be investigated and how (see Figure 1)?
 - How does one identify generic and context-specific judgements of success and lessons?

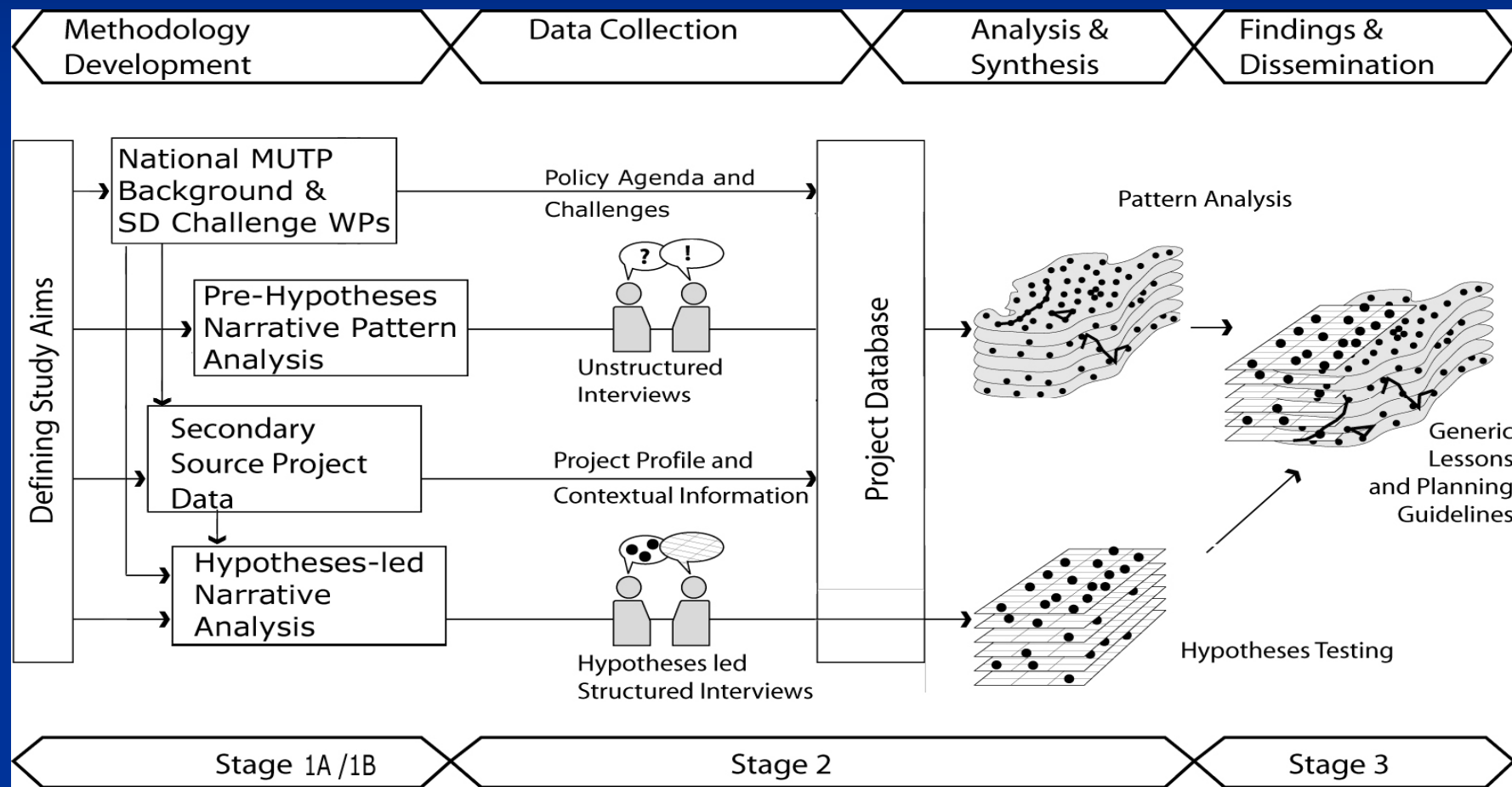
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- **Data collection methodologies and sources**
 - The issue of which perspective(s) the performance of MUTPs should be judged (and their relative importance) is seen as critical.
 - Data collection and data availability can often unwittingly pre-determine these perceptions by virtue of the fact they are originate from parties with particular agendas and specific vested interests rather than a holistic perspective.

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- Bearing in mind these factors, the research programme seeks to collect the following information:
 - Data derived from MUTP stakeholders (including those impacted by projects) using pre-hypotheses website questionnaires and selected naïve face-to-face interviews, with an emphasis on story-telling employing *Narrative Pattern Analysis* methodologies developed by Cognitive Edge Ltd (one of the OMEGA Centre partners).
 - Information collected from secondary sources, including reports, websites etc. producing project profiles with information of project characteristics inserted into a shared web-based GIS data base with both geographical and spatial dimensions.
 - Data derived from MUTP stakeholders (including those impacted by projects) using hypothesis-led website questionnaires, face to face interviews employing both conventional interview questionnaire analysis and *Narrative Pattern Analysis* of story-telling of project experiences by selected key decision-makers.

Figure 1: Methodology for data collection

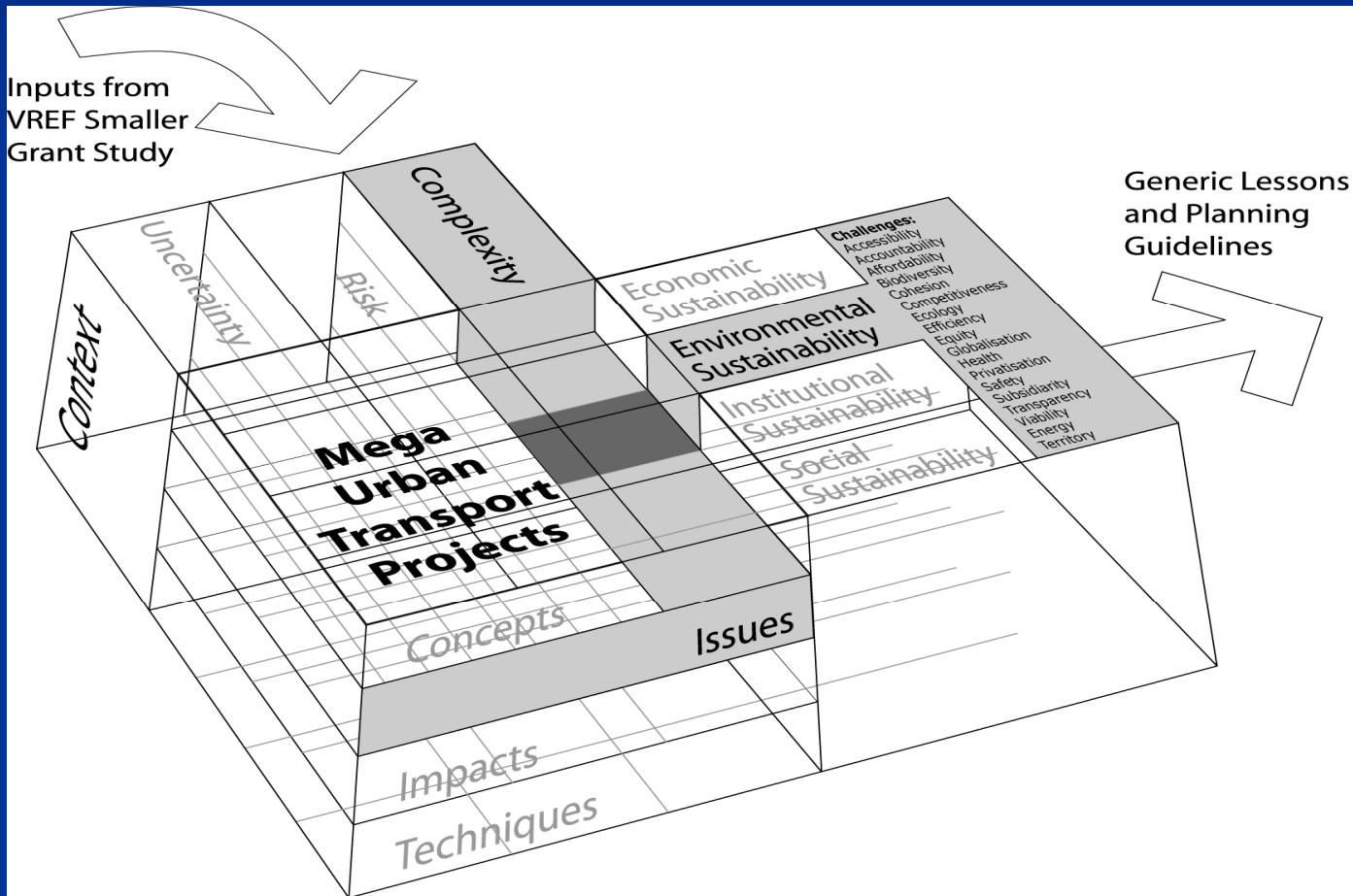


■ Criteria for judging MUTP success

- Currently the traditional criteria relating to cost overruns, completion dates, generation of travel time savings for users and adequate rates of returns to investors are by and large (although not always) the overriding criteria today seen to determine the ‘success’ or ‘failure’ of a MUTP. Completion within budget
- The new emerging agenda related to vision(s) of sustainable development (especially concerns about global energy shortages and climate change), however, increasingly raises doubts about the adequacy of the traditional criteria employed in the appraisal and evaluation^[1] of MUTPs. This new emerging agenda of sustainable development raises a number of very important challenges to MUTP development world-wide (see Figure 2) which are to be examined by the OMEGA Centre and its partners both as global concerns and concerns within specific case study projects.

^[1] Here appraisal is a term used for pre-project studies of the feasibility of projects while the term evaluation is confined to post-project studies of the impacts of MUTPs.

Figure 2: Study methodology framework



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■ **Case study analyses of MUTP components**

- The comparative case study of some thirty projects in ten different countries intends to identify generic and context-specific lessons for future MUTPs by comparing and contrasting:
 - The treatment of uncertainty, risk and complexity and highlight the importance of context.
 - The underlying and driving concepts.
 - The major issues confronted
 - The major impacts generated
 - The dominant methodologies and techniques employed (and any associated path dependency characteristics).

- **MUTP contributions to the sustainability vision**
 - Whereas as traditional criteria of MUTP appraisal and evaluation give priority to concerns of their contribution to economic growth and the ‘operational efficiency’ of the infrastructure and services in delivering such growth, sustainable development visions look to delivering on a far broader basis, paying far more attention to the socio, environmental and (hopefully) the institutional impacts with economic growth measured in terms of sustainable (positive and negative) growth.
 - Employing the latter as the basis for judging the ‘success’ and ‘failure’ of MUTPs is far more complex and challenging as it acknowledges that certain of the criteria are in fact in conflict, others change in priority and political importance over time and place, and yet others are not conducive to quantification, despite their importance.

Planning mega transportation projects: emerging lessons and challenges for China – Harry T. Dimitriou

- **To assess the contribution MUTPs make to sustainable development the OMEGA Centre sees it as essential to:**
 - Define sustainability, sustainable urban and regional development and sustainable transport clearly, and suggest both quantitative and qualitative indicators wherever possible.
 - Define economic dimensions of the sustainability vision clearly and the contributions they make to the overall concept of sustainability, urban and regional development, and sustainable transport providing both quantitative and qualitative indicators wherever possible.
 - Define environmental dimensions of the sustainability vision clearly and the contributions they make to the overall concept of sustainability, urban and regional development, and sustainable transport providing both quantitative and qualitative indicators wherever possible.
 - Define institutional dimensions of the sustainability vision clearly and the contributions they make to the overall concept of sustainability, urban and regional development, and sustainable transport providing both quantitative and qualitative indicators wherever possible.
 - Define social/cultural dimensions of the sustainability vision clearly and the contributions they make to the overall concept of sustainability, urban and regional development, and sustainable transport providing both quantitative and qualitative indicators wherever possible.

- **The challenges to sustainability that MUTPs confront include the following:**
 - Enhanced accessibility
 - Greater accountability
 - Improved transparency
 - Affordability
 - Enhanced economic viability
 - Increased competitiveness
 - Support to globalisation
 - Improved access and use of resources of the private sector
 - Greater attention to concerns about biodiversity
 - Greater attention to ecological concerns
 - Enhanced social cohesion
 - Greater attention to concerns of subsidiary
 - Improved health and safety
 - Reduced energy consumption
 - Desired territorial restructuring outcomes

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Figure 3: The Partners and their Case Studies



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- **The MUTP case studies undertaken by the OMEGA Centre and its partners shown in the figure include:**
 - **Australia (undertaken by University of Melbourne)**
 - Sydney Harbour Tunnel
 - Perth Metro Rail
 - Melbourne City Link
 - **France (undertaken by Ecole de Chausses, Paris)**
 - Meteor in Paris
 - TGV Mediterranee
 - L2 in Marseille
 - Millau Viaduct and A75
 - **Germany (undertaken by Free University of Berlin)**
 - Inner-city Tunnel in Berlin (road, rail, subway)
 - BAB 20 Motorway from Hamburg to Rostock/Sczecin
 - ICE-High Speed Line from Cologne to Frankfurt/Main
 - **Greece (undertaken by University of Thessaly)**
 - Attiki Odos ('Athens Road' - motorway)
 - Rion Antirion Bridge
 - Athens Metro

Planning mega transportation projects: emerging lessons and challenges for China – Harry T. Dimitriou

- Hong Kong (undertaken by University of Hong Kong)
 - Western Harbour Crossing
 - KCRC West Rail Development
 - Airport Rail Link
- Japan (Tokyo Institute of Technology)
 - Tokyo AquaLine
 - Seikan Undersea Tunnel
 - Chiba Monorail
- Netherlands (undertaken by University of Amsterdam)
 - HSL- Zuid (fast speed TGV railway from Brussels to Amsterdam)
 - Randstadrail (inter-regional rail)
 - Westrandweg (including second Coentunnel)
- Sweden and Denmark (undertaken by University of Lund)
 - Öresund Link
 - The Southern Link
 - Copenhagen Metro
 - Arland Air-Rail Link

Planning mega transportation projects: emerging lessons and challenges for China – Harry T. Dimitriou

- USA (undertaken by New York University)
 - Alameda Corridor, Los Angeles, CA
 - I-15, Salt Lake City, UT (Highway Interstate)
 - AirTrain, Jamaica, Queens - transit NY
- UK (undertaken by University College London)
 - The CTRL (Channel Tunnel Rail Link)
 - Elisabeth II Bridge
 - Jubilee Line Extension

IMPLICATIONS OF RESEARCH FOR CHINA

- It is early days in the execution of the above research programme. The following list of miscellaneous issues is therefore a speculative list that may warrant examination in China if it wishes to systematically review whether its current and future MUTPs will contribute significantly to visions of sustainable development:
 - **Issue #1:** Whether the definitions of MUTPs need to be revisited or perhaps defined more clearly in terms of their physical boundaries and the extent of desired and expected impacts?
 - **Issue #2:** Whether the closed-system project management cultures that currently prevail in the delivery of MUTPs need to be complemented by more strategic planning skills that are more adept at treating complexity, uncertainty and risk-taking?
 - **Issue #3:** Whether the influence and importance of the fast changing (urbanisation, motorisation, modernisation) contexts on MUTPs in China need to be better understood, particularly given the further speed-up of change such projects might bring once completed?

Planning mega transportation projects: emerging lessons and challenges for China – Harry T. Dimitriou

- **Issue #4:** Whether the appropriateness of soft and hard technology-transfer from the West in MUTP developments should be re-examined, especially in the planning, appraisal and evaluation of such projects, as well as in their construction, management and operation once completed?
- **Issue #5:** Whether the current transparency and accountability of MUTP decision-making facilitates the achievement of sustainable development visions and whether the increase in privatised global investment in such projects will bring improvements to transparency and accountability concerns?
- **Issue #6:** Whether increased privatisation initiatives in MUTPs for ‘strategic infrastructure’ should be welcomed and if so, to what level?
- **Issue #7:** What the value of international and Chinese story telling as a source of knowledge-building for future MUTP development is, and how easily (culturally) can stories be reliably collected?
- **Issue #8:** What are the limits of traditional MUTP appraisal and evaluation criteria as typically adopted in China (and elsewhere) assessed against emerging international visions of sustainable development and how suitable are such visions for China, locally?
- **Issue #9:** What is the value of building a national data-base and knowledge-base of MUTPs in China, to not only assess the extent to which such projects are/have been compatible with global and local concepts of sustainability but also to establish whether they can offer the West some positive generic lessons?
- **Issue #10:** What are the implications of the increased/reduced governmental regulative and planning frameworks for MUTPs in China and what are the most appropriate levels and circumstances of intervention by government in both their planning and operation?