

## SP 2004-03 - ABSTRACT

### GENERIC LESSONS FOR IMPROVING THE TREATMENT OF RISK, UNCERTAINTY AND COMPLEXITY IN THE PLANNING OF MEGA URBAN TRANSPORT PROJECTS

OMEGA CENTRE, UNIVERSITY COLLEGE LONDON

PROJECT STUDY TEAM:   **PROF. HARRY T. DIMITRIOU (STUDY DIRECTOR)**  
                                  **RICHARD OADES**  
                                  **DR. JOHN WARD**  
                                  **PHILLIP WRIGHT (RESEARCH FELLOWS)**

#### STUDY AIMS AND BACKGROUNDS

The principal aims of this study were to:

- identify key lessons that might be learned about the treatment of risk, uncertainty, complexity and context ('RUCC') from a variety of disciplines/professions from both outside and within the planning field for which such matters are central to their strategic and day-to-day decision-making activities;
- seek to apply these lessons to the planning, appraisal and delivery of Mega Urban Transport Projects (MUTPs)<sup>1</sup>.

The study, completed in 2008 and funded by the Volvo Research and Education Foundations (VREF), was based on a series of commissioned papers drawn from leading scholars and practitioners in a variety of fields including the military, earthquake engineering, civil engineering, medicine, agriculture, insurance and banking, together with disciplines more closely associated with MUTP planning and delivery.

The study comprised four main parts, as follows:

- Part 1: *Concept clarification: literature review of complexity, uncertainty, and risk in decision-making and planning.* Amongst other things, this led to the following working definitions of RUCC:
  - **Risk** - an uncertain consequence of an event or activity with respect to something that we value.
  - **Uncertainty** – an expression of confidence about the state of knowledge in/about a given situation, often relating to the future.
  - **Complexity** – arises in a system when a great many components interact simultaneously in a complicated manner.
  - **Context** – the multi-dimensional 'environment' within which a decision is made which represents a unique set of conditions that exerts influence on the nature of the decision, and is often affected by the impact of subsequent actions.
- Part 2: Contemporary treatment of Complexity, Uncertainty and Risk in strategic decision-making in selected disciplines. Nine commissioned papers were prepared concerning 'Earthquake engineering and seismic risk', 'Military Strategy and planning', 'Agriculture Pests', 'Public Health planning', 'Perspectives of the actuary in the insurance sector', 'Project Finance : A banker's perspective', 'The complexity of organizational trust', 'A new kind of competence: On avoiding mistakes in large organizations', and 'Naturalising knowledge management' (see References below). These papers were synthesised by the study team and key patterns of knowledge identified.
- Part 3: The treatment of Complexity, Uncertainty and Risk in urban transport, and city and regional policy-making and planning. A further six commissioned papers were prepared by leading scholars and practitioners concerning 'Great planning disasters re-visited', 'Property sector approach to major project risks', 'Risk and uncertainty in construction management', 'Managing risk in a hyper-mobile world', 'Complexity in city systems: Understanding, evolution, and design', 'Strategic thought and regional planning: The importance of context' (see References below). Again, these papers were synthesised by the study team and key patterns of knowledge were extracted.

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<sup>1</sup> Here MUTPs are defined as large-scale, complex land-based transport infrastructure projects costing in excess of US\$ 1 billion (at 1991 prices) that are located in urban and metropolitan areas/regions and frequently represent agents of strategic change.

- Part 4: The relevance of findings from Parts 1-3 to the planning, appraisal and evaluation of MUTPs - with particular reference to the emergent themes and lessons that can be applied to the project lifecycle.

## MAIN FINDINGS

It is clearly impossible in this short abstract to adequately summarise the key findings from the study. The following therefore presents *some* 'headlines' centred around five main themes associated with RUCC and the MUTP project lifecycle.

### **THEME 1: MUTP PROJECT LIFE-CYCLE: SQUARE PEGS INTO ROUND HOLES**

- MUTPs are frequently (wrongly) considered as 'closed systems' despite the many, varied and changing interfaces with the open system environments ('contexts') into which they are placed.
- Regular and sustained monitoring throughout the project lifecycle of all contextual influences is of utmost importance so as to enable the formulation of planning and delivery strategies capable of responding to changing circumstances.
- Changing demands placed on MUTPs can make it excruciatingly difficult to judge project successes and failures - changing demands placed on MUTPs (often during the project lifecycle) as commodities, services and instruments of public policy change, make it exceedingly difficult to establish what should be the correct criteria for judging whether projects are 'successful' or not at any point in time.

### **THEME 2: IMPORTANCE OF CONTEXT TO PROJECT LIFECYCLES**

- Context awareness is critical for all phases in the project lifecycle - 'context' encompasses a variety of dimensions for decision-making, including: culture and societal beliefs/ values, time and space, economic circumstances, institutional frameworks and networks and political influence. MUTP planning, appraisal and delivery has to cope with a very broad spectrum of contextual elements which will inevitably change during the various stages in the project lifecycle.
- 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.
- Understanding the reasons why MUTPs evolve as they do can provide vital information to planners and delivery agents. But, lessons from past history have validity only when context is taken fully into account – since history does not fully repeat itself.
- 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 lifecycle.
- Defining 'winners and losers' and the attendant different perceptions of MUTP 'success or failure' is a very significant task in understanding context. Today's winners may be tomorrow's losers and today's successes may become tomorrow's disasters (and vice versa).

### **THEME 3: IMPORTANCE AND NATURE OF 'STRATEGY' IN THE PROJECT LIFECYCLE**

- An effective strategy is one that achieves desirable (political) effects without incurring disproportionate costs. It must also produce an acceptable cost solution in face of perceived RUC and must balance requirements for implementing a vision with practical requirements of efficiency of services offered, cost ceilings etc. (which raises issues of short term vs. long term costs/benefits).
- MUTP planning and delivery strategies need to identify which forces of change they are trying to influence or harness. In particular, they need to be clear and consistent about such matters as project definition and how this interacts with wider agendas such as those surrounding 'sustainability' and 'regeneration'. Without such clarity, projects are vulnerable to the use/misuse of rhetoric.

- Strategies typically need to be flexible/adjustable and robust, paying due attention to short, medium and long term consequences simultaneously. Changes in context brought about by such influences as changing stakeholder positions are particularly important. Thus, the more specific or precise strategies are, the more they are vulnerable to RUC.
- In the early planning stages, there should be a clear statement of MUTP goals and objectives, roles and functions, appraisal criteria, key input assumptions and potential impacts - which all need to be properly disseminated/ thoroughly discussed with all impacted stakeholders in an open and transparent manner.
- Although perhaps unpalatable, it is important to concede that many components of MUTP planning, appraisal and delivery strategies are very difficult to identify or quantify. This is true throughout the project lifecycle as a result of the complexities associated with open and complex systems. Indeed, project impacts may only emerge over time and are frequently difficult to discern

#### **THEME 4: TOOLS, TECHNIQUES AND METHODS**

- Risk assessments and their subsequent use in MUTP planning and delivery need to be as all embracing and contextually sensitive as possible; able to anticipate contextual change; based on the concept of risk hierarchies; and accompanied by constant monitoring and iteration.
- Subjective assessment based on experience and common sense is acknowledged as an appropriate and effective response to RUC in decision-making. This is especially significant for sectors that acknowledge the complexities associated with 'open systems' and the consequent existence of 'unknowns' and the 'unknowable' – such as MUTP planning and delivery.

#### **THEME 5: STAKEHOLDERS**

- The ability to identify and understand motives, beliefs and values of the wide range of stakeholders involved in or impacted by MUTPs is extremely difficult, but vitally important.
- Stakeholders often perceive RUC in a highly individual way. Such perceptions may change over time, from one lifecycle phase to another, or as policy and political agendas change. This needs the constant updating and recalibrating of judgements of the related parties.
- Risk may be shared through consensus building between stakeholders.
- MUTP planners, appraisers & deliverers need to identify which key decisions require high levels of trust to be implemented successfully. This calls for the identification of 'trustees and trustors' (clarification of whom to trust and by whom). Success reinforces trust (and vice versa) and that the higher the RUC associated with a particular action/decision, the higher the need for trust.

## **CONCLUSIONS**

The study has provided many varied and valuable insights into the treatment of RUCC by both disciplines/fields not normally associated with MUTP planning and those that might be considered closely allied to such work. In particular, what emerges most strongly from the study is the clear message that there is much to be gained by looking beyond traditional professional silos for clues as to how RUCC can be identified, analysed and accommodated through the development of meaningful, yet flexible and robust strategies.

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