



EUROPE

THE ARTS
CHILD POLICY
CIVIL JUSTICE
EDUCATION
ENERGY AND ENVIRONMENT
HEALTH AND HEALTH CARE
INTERNATIONAL AFFAIRS
NATIONAL SECURITY
POPULATION AND AGING
PUBLIC SAFETY
SCIENCE AND TECHNOLOGY
SUBSTANCE ABUSE
TERRORISM AND
HOMELAND SECURITY
TRANSPORTATION AND
INFRASTRUCTURE
WORKFORCE AND WORKPLACE

This PDF document was made available from www.rand.org as a public service of the RAND Corporation.

[Jump down to document](#) ▼

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world.

Support RAND

[Browse Books & Publications](#)

[Make a charitable contribution](#)

For More Information

Visit RAND at www.rand.org

Explore [RAND Europe](#)

View [document details](#)

Limited Electronic Distribution Rights

This document and trademark(s) contained herein are protected by law as indicated in a notice appearing later in this work. This electronic representation of RAND intellectual property is provided for non-commercial use only. Unauthorized posting of RAND PDFs to a non-RAND Web site is prohibited. RAND PDFs are protected under copyright law. Permission is required from RAND to reproduce, or reuse in another form, any of our research documents for commercial use. For information on reprint and linking permissions, please see [RAND Permissions](#).

This product is part of the RAND Corporation technical report series. Reports may include research findings on a specific topic that is limited in scope; present discussions of the methodology employed in research; provide literature reviews, survey instruments, modeling exercises, guidelines for practitioners and research professionals, and supporting documentation; or deliver preliminary findings. All RAND reports undergo rigorous peer review to ensure that they meet high standards for research quality and objectivity.

TECHNICAL REPORT

Setting the Agenda for an Evidence-based Olympics

Evidence-based Olympics Team

Prepared for RAND Corporate

The report was performed as part of the RAND Corporation's continuing program of self-initiated research. The research was conducted by RAND Europe.

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

RAND® is a registered trademark.

© Copyright 2007 RAND Corporation

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from RAND.

Published 2007 by the RAND Corporation
1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1200 South Hayes Street, Arlington, VA 22202-5050
4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213-2665
Westbrook Centre, Milton Road, Cambridge CB4 1YG, United Kingdom
RAND URL: <http://www.rand.org>
RAND Europe URL: <http://www.rand.org/randeurope>
To order RAND documents or to obtain additional information, contact
Distribution Services: Telephone: (310) 451-7002;
Fax: (310) 451-6915; Email: order@rand.org

Preface

This report, prepared for interested parties in the delivery and success of the London 2012 Olympic and Paralympic Games,¹ presents a meta-analysis of Olympic Games and mega-event policy issues based on a literature review of previous evaluations and analyses. The objective of this meta-analysis is to identify many key questions and issues that should be addressed in order to contribute to London 2012's aspiration as the most successful modern Games. Our meta-analysis is based on the belief that research and analysis can lead to more effective evidence based policy making. We highlight two policy areas in which specific research tools can be used to facilitate evidence based policy making. Transport and security are critical to London's Olympic legacy (both in terms of infrastructure and a successful Games).

In brief, the report is divided into three research sections:

-  • A **meta-analysis** of policy areas that are pertinent to the planning, delivery and legacy of London 2012. This takes evidence from previous studies and combines them to identify what the key areas are in which evidence based policy can be an effective tool in ensuring the success of the London Games.
-  • A **research agenda for transport and infrastructure**. By investigating the behaviour of travellers and of the transport system, it will be possible to create a system that functions effectively and efficiently during the Games and is a sustainable system post-Games. This chapter also investigates how the same modelling technique can be applied to land use legacy in the regeneration of East London.
-  • A method for **understanding the security agenda** for London 2012. Clearly identifying what the security environment will be in five years time is remarkably difficult, however there are tools available that can aid understanding of the interactions of different aspects of Olympic security - hostile intent; operational capability; and potential influences on security. By investigating the interaction of these three aspects, it is possible to identify the security capabilities required to address different threats to security during London 2012 (thus identifying effective allocation of resources).

¹ Throughout the rest of this document, the Olympic and Paralympic games are identified as one event and referred to as 'the Olympics'. This is because the challenges faced by policy makers apply to the staging of the event, not to one specific games, be it Olympic or Paralympic.

This report is not designed to provide the answers to all of the questions surrounding effective and efficient delivery of London 2012, but it does identify where research and good evidence can help London to put on the most successful modern Games. This will allow the London Olympics to build on the learning and expertise from other Games and to provide an accountable Olympics (important in terms of the recent National Audit Office and House of Commons Select Committee for Culture, Media and Sport reports).²

We expect this report to be of interest to anyone who is involved in the planning, delivery or legacy of London 2012. We envisage this being in three main policy areas:

- Those in the Olympic movement – such as the Olympic Delivery Organisation; London Organising Committee for the Olympic Games; British Olympic Association; and National Olympic Committee.
- Policy makers related to the Olympics – such as the London Development Agency; Department for Culture, Media and Sport; Department for Transport; Home Office – Office for Security and Counter Terrorism; Department for Transport and Transport for London; and the London Mayor’s Office.
- Other interested groups – such as the Metropolitan Police; London Underground; Department for Health; East London resident groups; Olympic sponsors; and Development Agencies outside London.

This is not a comprehensive list of parties who might be interested in the contents of this report, but provides an overview of the sorts of organisations and individuals who may benefit from an evidence based approach to the London Olympics.

RAND Europe is an independent not-for-profit research institute whose mission is to help improve policy and decision-making through research and analysis. RAND Europe’s in-house teams offer multidisciplinary and multinational research strengths, both substantive and methodological. RAND Europe’s work lies on the continuum between that of universities and consultancies, combining the academic rigour of universities and the professional, task oriented approach of consultancies.

RAND Europe’s Evidence Based Olympics Team is a cross-cutting research team drawing on expertise from all aspects of RAND Europe’s public policy research. In the production of this report, the team would like to acknowledge the work of Lindsay Clutterbuck; Edward Nason; Ruth Levitt; Lisa Klautzer; Michael Hallsworth; Lila Rabinovich; Samir Puri; Greg Hannah; Aruna Sivakumar; Flavia Tsang; Peter Burge; and Cameron Munro. We would also like to acknowledge the contribution of Lynne Saylor; Kate Kirk; Jonathan Grant and Hans Pung for insightful comments on the report. This study has been funded by RAND Corporation investment funding.

² National Audit Office (2007), *Preparations for the London 2012 Olympic and Paralympic Games – Risk assessment and management*, HC 252 Session 2006-2007; House of Commons Culture Media and Sport Committee (2007) *London 2012 Olympic Games and Paralympic Games: funding and legacy*. HC 69-1, Session 2006-07

This report has been peer-reviewed in accordance with RAND's quality assurance standards (for more information, see <http://www.rand.org/about/standards/>) and therefore may be represented as a RAND Europe product.

For more information about RAND Europe or this document, please contact:

Dr Lindsay Clutterbuck

RAND Europe

Westbrook Centre, Milton Road

Cambridge, CB4 1YG

Tel: 01223 353 329

lindsayc@rand.org

Contents

Preface.....	i
Summary.....	viii
London 2012 needs an evidence base for accountability	viii
There is an evidence base on mega-events that can provide accountability	viii
Primary research can add to the evidence base for London 2012.....	ix
More evidence will be needed for London 2012 to be the best Games yet	ix
CHAPTER 1 Why do we need an evidence based Olympic Games?.....	1
1.1 Turning London’s 2012 bid into reality	1
1.2 Why an evidence based Olympics?	2
1.3 Evidence based policy making	2
1.4 Research and evaluation in government.....	4
1.5 Limitations of evidence based policy.....	5
1.6 Defining the agenda for 2012.....	6
1.7 Scope of the report	6
CHAPTER 2 Setting the evidence based agenda.....	7
2.1 Health: Achieving benefits for the nation and visitors.....	8
2.2 Volunteering: making use of the skills on offer	10
2.3 Employment: moving from benefits to benefit	12
2.4 Governance and accountability: Ensuring the gold standard.....	14
2.5 Economic development: Spreading the benefits.....	16
2.6 Tourism: Competing in a world class field.....	18
2.7 Transport: More than just A to B	20
2.8 Regeneration: A new hope.....	22
2.9 Land Use: Building physical strength for London.....	24
2.10 Environment: The greenest games	25
2.11 Civic engagement: The people’s games	27
2.12 Multiculturalism: Celebrating Britain’s diversity with the world.....	28
2.13 Security: Understanding the risks	29
CHAPTER 3 A research agenda for transport and infrastructure	33
3.1 Effective transport planning is critical for mega-events.....	33
3.2 Rigorous travel demand modelling is key to effective transport strategy	34

3.2.1	Rigorous travel demand models are comprehensive and behaviourally realistic.....	34
3.2.2	Modelling travel demand during 2012 will be a challenge.....	36
3.2.3	An effective model has a strong basis in data and an understanding of behaviour	37
3.3	Transport/land use legacy impacts of the Olympics can also be modelled	40
3.3.1	Regeneration of East London.....	40
3.3.2	Housing market.....	41
3.3.3	Economy	42
3.3.4	Further Studies	43
3.4	A behavioural approach to cost-benefit analysis of infrastructure investments.....	44
3.4.1	The need for independent quantitative assessment	44
3.4.2	The challenge – how to measure benefits?	44
3.4.3	Use of discrete choice experiments	44
3.4.4	Modelling the preferences of different groups in society.....	45
3.4.5	Calculating the 'value' of investments	46
3.5	Summary	46
CHAPTER 4	Understanding the security agenda	49
4.1	The security environment in 2012 is unclear	49
4.2	An approach for developing potential future security environments	50
4.3	Defining potential security environments	53
4.4	Assessing the capability implications of potential environments	58
4.5	Thinking systematically about security in 2012.....	61
APPENDICES	63
Appendix A:	Meta-analysis framework.....	65



Summary

Big projects bring big challenges, and organising and running the Olympics is just about as big as it gets. This report shows policymakers, organisers and implementers a way to create the right foundations for the decisions that will determine the success or failure of London's Olympic Games.

London 2012 needs an evidence base for accountability

Evidence based policy making is now the norm. We know we have to examine the past in order to plan for the future, and that only by pointing to tangible evidence for what works can we justify the use of public funds. The 2012 Olympics, more than any other major publicly funded project, will be under the glare of the media spotlight until long after the 2012 Games are over. We have to get it right. Action must be taken now if we are to keep control of the Olympics agenda in the eyes of the public, Government, and the International Olympics Committee.

Policy makers, organisers and implementers of the Olympic Games must have a sound basis for their decisions that enables them to make the best possible use of resources, anticipate potential problems, deal with actual problems, and deliver a Games and a legacy that will testify to their efforts. Only by using the detailed and considered analysis of a comprehensive evidence base will those involved be able to demonstrate that their decisions are robust.

Chapter 1 of this document identifies the requirements for and trend towards evidence based policy making in the UK, and links this to the planning, delivery and legacy of London 2012. It sets out the context in which policy making for the London Games must take place.

There is an evidence base on mega-events that can provide accountability

Each Olympic Games is unique, and what worked in Sydney will not necessarily work in London. Evidence analysed correctly shows us what works, and equally important, what doesn't. In Chapter 2 of this paper, RAND Europe looks at many of the key questions to ask as we build the Olympics evidence base for a number of the issues that organisers must explore, including health, volunteering, employment, governance and accountability, economic development, tourism, transport, regeneration, land use, environment, civic engagement, multiculturalism and security. We show how meta-analysis of previous Olympic Games and other mega-events should be applied, not only to ensure that all the information from past events on this scale is analysed and taken into account, but also to examine the evidence for best practice and how it can be applied to London 2012.

This meta-analysis identifies issues and evidence that are pertinent to the planning, delivery and legacy of London 2012 by examining previous studies of Olympics and mega-events. By identifying the questions that can and should be addressed by those with a stake in the London Olympics, we start to build the evidence based agenda for the Games.

Primary research can add to the evidence base for London 2012

It is not just important to build on previous studies however; having a valid research programme to investigate the specific contextual problems associated with London 2012 (defined by geography, culture and timing) will allow us to answer questions that cannot be addressed by understanding previous events. This programme of primary research can sensibly build upon the secondary research of any meta-analysis. To illustrate using the evidence base in more depth to take things forward, we look at two critical areas that will have resounding impacts up to and after the Games, transport and security.

Creating a transport system that functions effectively and efficiently during and after the Games is in everyone's interests. By investigating options surrounding transport choices made by travellers, RAND Europe can apply its modelling methods to facilitate this outcome. Furthermore, the same modelling techniques can be applied to the legacy for land use in the regeneration of East London.

The 2012 Olympic Games promise to pose a massive security challenge. Clearly identifying what the security environment will be in five years time is remarkably difficult. However, there are tools available that can deepen understanding of the interactions of different aspects of Olympic security. We show how a future scenarios model developed by RAND Europe for a government department can be applied to the Olympics to help reduce the security threat.

More evidence will be needed for London 2012 to be the best Games yet

This paper offers the starting point for developing an evidence base for the London 2012 Olympics. It should not be the end of the evidence base however. There is a need for a full understanding of the details of evidence from both secondary and primary research, and this paper identifies where this evidence base could provide real learning opportunities for the organisers of, and interested parties in, London 2012. Within the meta-analysis section (Chapter 2) we identify questions that can be addressed through a more in-depth meta-analysis, either of multiple streams of policy or in specific research areas such as tourism or healthcare. Whilst in Chapters 3 and 4 we outline potential studies that will provide a greater evidence base in two specific policy areas.

Figure 1 illustrates the set out of the report, and outlines the areas in which we have identified where evidence can inform the planning, delivery and legacy of London 2012. The figure shows the three time windows in which evidence can help in Olympic policy making (planning; delivery and legacy). At each of these stages, there are a large number of themes in which an evidence base could help policy. These themes are covered in the meta-analysis (Chapter 2 of this document) and lead onto a number of questions that can be answered in order to provide an evidence based agenda for the Olympics in London. Two of the themes have been highlighted in the figure – Transport and Security.

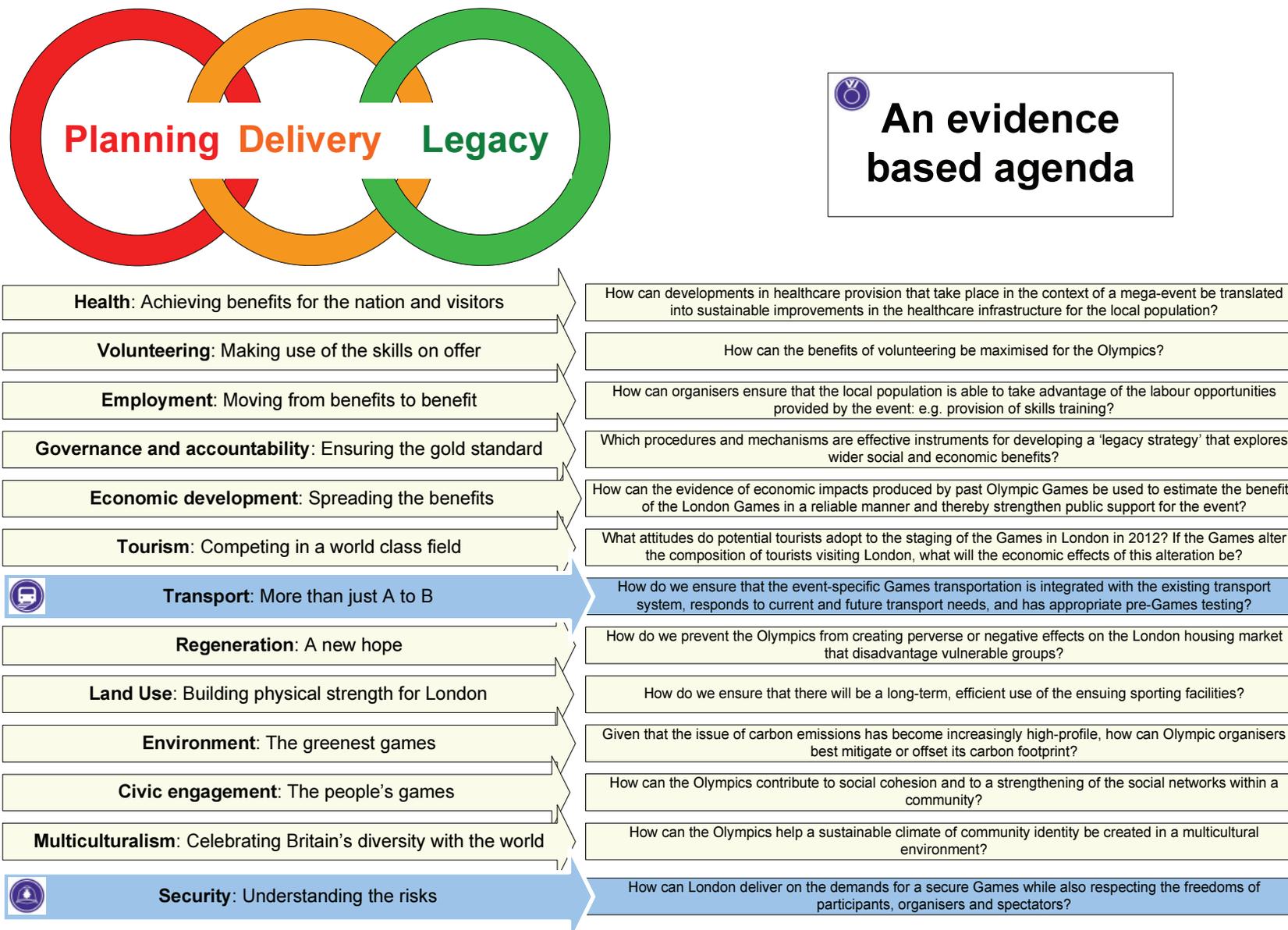


Figure 1. Overview of the evidence base required for the Olympics



CHAPTER 1 **Why do we need an evidence based Olympic Games?**

“The success of London’s bid to host the 2012 Olympic Games and Paralympic Games was the cause of national celebration. ...but doubts have already emerged, both about the cost of staging the Games and about whether a lasting benefit can be achieved.”

House of Commons Culture Media and Sport Committee *London 2012 Olympic Games and Paralympic Games: funding and legacy*. Volume 1, p.3. HC 69-1, Session 2006-07, January 2007

1.1 **Turning London’s 2012 bid into reality**

London’s bid to host the 2012 Olympic Games, like those of all its competitors, relied on a great deal of (sincere) guesswork, promises and hopes. Now that the London bid has been accepted, everything that it promised has to be turned into real commitments, plans, budgets, and operational workstreams. This enormous endeavour has to be underpinned throughout by sound financial management, along with suitable organisational structures and governance arrangements where all the accountabilities are assured.

London’s Olympic organisers face an immensely difficult task. They have several high-profile masters to please, nationally and internationally, and they will spend a great deal of public and private money over many years. Conventional wisdom suggests that the track record of host cities and nations in achieving all that they hoped and promised is patchy. Aspirations have included:

- Identity building and signalling (e.g. Atlanta wished to create a new vibrant identity for the city through the Olympics; the joint World Cup bid by Japan and South Korea aimed to bring together two previously politically diverse countries);
- Economic development (Lillehammer Winter Olympics);
- Urban renewal (Manchester Commonwealth Games; Barcelona Olympic Games);
- National branding and tourism (Sydney Olympics);
- Political liberalisation (a hallmark of the successful Beijing 2008 bid, the 1995 South Africa Rugby World Cup and the Seoul Olympics);
- Lasting legacies of facilities (Atlanta, Barcelona).

There have been cost over-runs in all recent Olympics, some far greater than others – Greece will have to deal with its financial over-exposure for many years to come. Other goals have been missed at mega-events, Lillehammer could not maintain the tourist trade that the Winter Olympics brought, and the USA has not seen an increase in soccer's popularity since hosting the World Cup in 1994. There have been successes too, such as the business legacy and long-term urban regeneration of Atlanta and Barcelona, the tourism legacy in Sydney, Calgary's western heritage reputation, the advanced traffic management system in Salt Lake City, and the improved transport infrastructure in Seville following the World Expo in 1992. In the UK, the organisers of the 2002 Golden Jubilee celebrations successfully co-ordinated multiple events in diverse locations. This paper suggests how London organisers can greatly strengthen the evidence and analysis upon which to base their work, by learning crucial lessons from previous events, and by incorporating valuable knowledge and experience from other relevant sources.

1.2 Why an evidence based Olympics?

The reasons behind positive and negative outcomes of Olympics and other mega-events need to be evaluated and interpreted closely and actively. It is possible – and essential – for the London Olympics organisers and the major stakeholders in the 2012 Games to make well-informed decisions with respect to the Games. A stronger evidence base will help the organisers avoid repeating predictable mistakes and enable them to seize important opportunities to raise the quality of planning and implementation. By having more objective, insightful analysis of the relevant evidence to hand, the organisers could significantly reduce the current areas of risk, and anticipate and tackle potential failures or under-achievements more effectively. We show in this paper how, by using a richer, more analytical evidence base, the organisers can think ahead more accurately, resolve actual problems, and make much better use of their collective efforts and resources.

We summarise briefly here the current context of ideas and experience on evidence based policy making, and how policy research and evaluation can be used to inform the decisions that policy makers have to take.

1.3 Evidence based policy making

Evidence based policy making has become, over the last decade at least, a dominant influence in UK government thinking and in the public sector more widely. The Labour government elected in 1997 claimed that 'what counts is what works':

New Labour is a party of ideas and ideals but not of outdated ideology. What counts is what works. The objectives are radical. The means will be modern.

Labour Party Manifesto, 1997

This signalled the intention that policy making should be different from then on, that it should deliberately be much more pragmatic and business-like, much less ideological. The focus was to be on evidence of whether policies were effective: were they achieving specific outcomes? This was enshrined in an official statement from the Cabinet Office:

This government expects more of policy makers. More new ideas, more willingness to question inherited ways of doing things, better use of evidence and research in policy making and better focus on policies that will deliver long term goals.

Cabinet Office *Modernising Government*, Cm4310, 1999

That sort of language and thinking has become commonplace among UK policy makers and decision makers in central and local government, and in the public services and publicly funded agencies. Academic and other researchers are becoming more familiar with the language of ‘research utilisation’, ‘getting research into practice’, and ‘knowledge transfer’. More policy makers are becoming research-literate. The concept of ‘value for money’ as applied to policy making and policy outcomes has grown in influence too. Audits and inspections closely monitor and assess the performance and accountability of the health services, education, criminal justice, transport, agriculture energy and environment policies, foreign affairs and defence, looking to see that plans, operational decisions and professional activities and advice are more evidence based. No area of public policy has been immune from this trend. League tables, star ratings, best practice reviews and policy reviews are some of the mechanisms now regularly used to assess and control policy-making and its impacts.

Consistent with this trend, the public funding and management of sport, tourism, arts and culture have had to become more evidence based in order to secure public funding and political support. The organisation and delivery of the 2012 Olympics are already being closely watched by the Culture, Media and Sport Committee of the House of Commons³ and the National Audit Office,⁴ who have both stated their intention to keep a continuing eye on progress and problems and to report regularly.

Evaluation methodologies have evolved to meet the new need for evidence based practices. One such methodology, ‘meta-analysis’, provides a systematic approach that suits the evaluation of diverse sources and types of evidence, and can take account of social, political and economic influences. It is straightforward and involves five main steps:

1. Define the agenda - identify the broad issues, questions, policies and decisions that must be addressed.
2. Identify relevant criteria for selecting the evidence base.
3. Select the items to go into the evidence base.
4. Analyse the items in the evidence base using the criteria.
5. Refine the agenda – use the analysis to revise the agenda and focus the decision making on priorities.

We recommend this method to the Olympics organisers; we discuss it further below.

³ House of Commons Culture Media and Sport Committee (2007) *London 2012 Olympic Games and Paralympic Games: funding and legacy*. HC 69-1, Session 2006-07

⁴ National Audit Office (2007) *Preparations for the London 2012 Olympic and Paralympic Games – risk assessment and management*. HC 252, Session 2006-07

1.4 Research and evaluation in government

Clearly, for the criterion ‘what works’ to be meaningful, policy makers have to be able to find out what effects their policies are having. The evaluation of impact is thus a crucial dimension of policy research and analysis. Policy makers need research and evidence about impact that is timely and is presented in language they can readily understand. Academic research has not always been sufficiently accessible or intelligible to policy makers. Ministers and civil servants have long complained that university research agendas, timing and subject focus have often been irrelevant or only poorly aligned with the Governments’ policy concerns and timetables. The Treasury, the Office of Science and Innovation (formerly Office of Science and Technology) in the Department for Business, Enterprise and Regulatory Reform (formerly the Department of Trade and Industry), the research councils and the Cabinet Office have therefore recently become much more focused on bringing evidence and policy closer together.⁵ A National Audit Office study (commissioned from RAND Europe in 2003) called *Getting the Evidence*,⁶ recommended:

- Departments, with the support of the Office of Science and Technology, need to be clear about their strategic research aims and establish coherent systems for procuring research - including its commissioning, quality assurance and use.
- Departments, with the support of the Office of Science and Technology, need to be proactive and innovative in the way they disseminate and use research findings.
- Departments, with the support of the Office of Science and Technology, need to identify and share best practice and thus improve the effectiveness of commissioning, managing and using research.

Many government departments, not only those dealing with ‘scientific’ policy topics, have now appointed a ‘Chief Scientific Advisor’. There are ‘Analytical Services’ teams in departments, where in-house research is done and the commissioning of external research is handled. The research might include work by sociologists, historians, philosophers, economists, anthropologists, criminologists and others. More of the basic research that universities initiate now has to demonstrate greater relevance and applicability to decision makers in government, the public services and business in order to satisfy funding requirements. The DTI Foresight programme has introduced knowledge pools to hold national information on defined topics (www.foresight.gov.uk). The Cabinet Office’s PolicyHub website (www.policyhub.gov.uk) provides links to guidance and tools to improve policy making.

⁵ See for example checklists produced by the Office of the Government Chief Social Researcher in *The Magenta Book*, Chapter 2, pp.23-27. http://www.gsr.gov.uk/downloads/magenta_book/Chap_2_Magenta.pdf

⁶ NAO (2003). *Getting the Evidence: using research in policy making*, HC 586-I, Session 2002-03

The successful policymaker needs to combine this evidence based approach with political instinct, foresight and creativity. This means the modern policymaker, and other research users, need to be sophisticated in applying research; knowing when evidence and different types of evidence are appropriate. At the same time the research community need to be more sophisticated in their understanding of the policy process.

National Audit Office (2003) *Getting the Evidence*, para 4.1

Some policy makers and service managers are tempted to see their own area as unique or special, and therefore not susceptible to meaningful comparisons. And some researchers are still tempted to disregard or discount the important (though sometimes ‘messy’) contextual influences on policy decisions and implementation. Experience with policy and with research repeatedly shows that the risks associated with ‘reinventing the wheel’ can be very expensive, and are avoidable. Ignoring or dismissing the significance of evidence from relevant comparisons, denying the influence of contextual factors, or failing to recognise warning signals early enough, are all unnecessary and irresponsible.

1.5 **Limitations of evidence based policy**

Evidence and analysis can help policy makers to develop policies that are more realistic and focused. They provide a baseline for measuring change, and cost effectiveness in specific cases. However, experience with evidence based policy making also reveals that tidy or complete answers about ‘what works’ are not necessarily possible in every case. Furthermore, even when robust evidence and analysis exist, decision makers often cannot, or choose not to, translate the messages that are available from the evidence base into their decisions about policy or practice. Evidence and analysis cannot resolve inherent contradictions between political and other interests in a particular sphere. Nor can an evidence informed approach resolve ambiguities or inconsistencies in the fundamental processes of public policy making itself.

Another concern that has surfaced is the risk of blurring the boundary between independent research and advocacy. In part this is a consequence of the public expenditure policy system itself, with its apparatus of spending reviews and public service agreements. The public services are increasingly having to justify their scale and use of public funding, typically to their sponsor departments, which in turn have to negotiate with the Treasury to protect or increase their funding. Some service managers and policy makers commission research in house or from academic or independent researchers specifically to generate evidence that will support their advocacy arguments. They know what sort of questions they have to be able to answer to satisfy their paymasters about outcomes and value for money. Where they believe that the services they are responsible for deserve that support, they may seek research evidence that will deliver exactly those answers. The independence and objectivity of such research could be compromised.

Furthermore, policy makers increasingly have to deliver policies and decisions that will have impact beyond their immediate domain, to address large scale and long term problems – for example to reduce deprivation and poverty, to deliver regeneration and improve social inclusion, to tackle discrimination, to shift attitudes and alter behaviours.

For these complex issues with multiple causes, the question ‘what works’ is too simple, and some of the evidence that is available can be hard to interpret in those simple terms.

1.6 **Defining the agenda for 2012**

Each Olympic Games is a huge project – or rather a series of several inter-related major projects – that carries political, financial and cultural policy agendas alongside the sporting agenda. The enormous logistical and technical challenges of such an event mean that the hosts face non-stop pressure to deliver ‘on time and on budget’, in the unforgiving gaze of the world’s media. The organisers’ statements on the cost estimates are already (and predictably) encountering criticisms. This demonstrates exactly the sort of opportunity that could be used (but is currently being missed) to develop a robust evidence base for such statements, that draws relevant lessons from experience, and applies them to the practical realities and in the political context

1.7 **Scope of the report**

The foundation of this study is a meta-analysis of existing relevant evidence on previous Olympics and other mega-events. Taking a broad overview, we identify areas where detailed evidence can support the organisation and delivery of the London 2012 Games. We identify the key issues that London 2012 has to address, as indicated by this solid evidence base, and we relate it to goals set out in the London bid. We carry out a literature review of previous evaluations, identifying tractable questions that need to be addressed with good evidence. We then look deeper into two fundamental areas for the Olympics, to illustrate how to use the evidence base in defining the agenda. The two areas are transport modelling and security.

The transport modelling work involves four mini-studies of the Olympic Delivery Authority (ODA) transport plan; these feasibility studies assess the application of different models to each policy question. We use quantitative modelling, policy analysis and identification of future more detailed analysis and modelling.

The work on security focuses on the environments relevant to the Olympic Games period, to facilitate an assessment of the importance of individual UK domestic security capabilities, and assist in such areas as planning security exercises and resource allocation. We develop a future scenarios model that has been successfully used by RAND Europe for a government department.

By answering the questions posed in this report, authorities and stakeholders can develop a sound way to take decisions, anticipate potential problems, resolve actual problems, and make the best use of resources to deliver on the aspirations of the London bid.



Previous Olympics and other mega-events provide a wealth of experience and information that can be mined to ensure that London 2012 is the most comprehensively evidence based Olympics yet. By analysing previous evaluations and research on these mega-events, we can build a solid agenda for gathering appropriate evidence for decision making before, during and after London 2012, ensuring effective planning, efficient delivery and a sustainable legacy after the Games (see Figure 2). This chapter provides an overview of some of the evaluations and information available and begins to identify the key issues and questions that will face London as it seeks to put on the best Games in the modern era. Each section contains a list of questions that arise from the evidence collated in this meta-analysis. These questions are tractable ones that a sound evidence base, through a more in-depth meta-analysis or continuing primary research, can help answer.

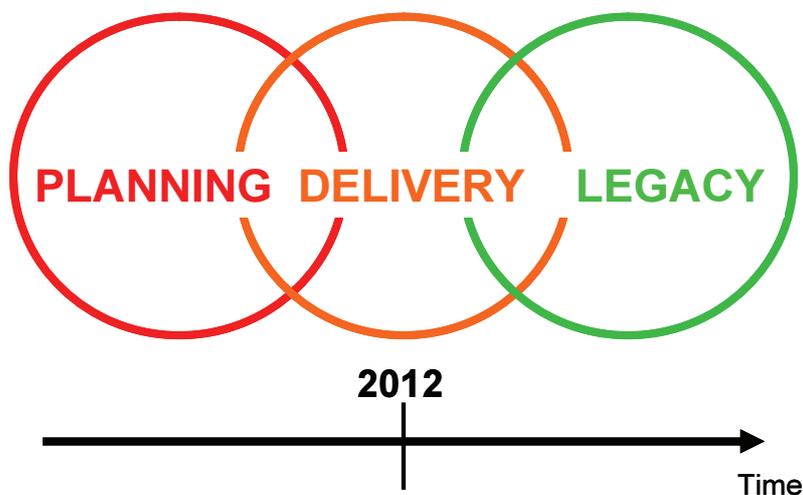


Figure 2. The stages involved in the Olympics where evidence can be beneficial

The analysis in this chapter covers diverse cross cutting issues from health and healthcare through to security in the mega event environment. These sections are based on a framework developed through a preliminary literature scan on mega event evaluations (see Appendix A for details). Each section identifies evidence that can be used at one of three stages in hosting an Olympic Games: planning prior to the Games; management of delivery issues during the Games itself; and the legacy of the Games. Within each cross-cutting issue, we identify specific research questions that arise from previous evaluations and the evidence collected. These are the sorts of questions that a more in-depth meta-

evaluation can start to answer, and with appropriate evidence will facilitate either the planning, delivery or legacy (or a combination of the three) of London 2012.

As mentioned previously, we also build the evidence base for transport and infrastructure, and security issues (chapters 3 and 4 respectively) for London 2012, utilizing RAND Europe research expertise to begin addressing questions identified as an essential part of the agenda for an evidence based, accountable and most of all successful Games.

2.1 **Health: Achieving benefits for the nation and visitors**

To date, research on health and mega-events (particularly sports mega-events) centres particularly on providing for the medical needs of athletes and visitors, and risk preparedness in case of public health disasters (including bio-terrorist and other terrorist attacks, a break out of food- or water-borne disease, and so on). Very limited research exists on developing a health infrastructure in the community where a mega event takes place as a part of its legacy. Health systems put in place prior to Olympic Games, for example, have been of interest to evaluators solely in the context of the Games, and it is generally assumed that they are dismantled following the Games.

According to existing research, the main objectives of public health preparedness before, during and after mega-events such as Olympic Games, tend to include:⁷

- detecting and responding rapidly to disease outbreaks, particularly through the establishment of surveillance systems to quickly detect emerging outbreaks of disease;
- preventing food-borne and water-borne infectious diseases, and other preventable conditions such as heat-related illnesses during summer Olympics;
- ensuring that the medical response to emergencies, whether individual or involving large numbers of people, is timely and of high quality;
- ensuring the appropriate response to different types of emergencies involving large numbers of people, for example terrorist attacks with biological or chemical weapons, natural disasters and so forth; and
- taking advantage of the Olympics as an opportunity to launch health promotion campaigns.

Atlanta, for example, established the first comprehensive public health surveillance system for an Olympics Games, an example that was then followed by Sydney and others. In Atlanta, a series of actions were undertaken around ensuring public health during the 1996 Olympics and regulations and systems put in place. These included: augmented surveillance for a variety of diseases, new regulations to ensure safe food services, provisions for solid waste disposal and sewage disposal, health promotion campaigns, for example

⁷ Brennan, R. et al (1997) 'Medical and public health services at the 1996 Atlanta Olympic Games: an overview', *The Medical Journal of Australia*, 167, 595-598

against STDs and dehydration, and medical disaster planning in the event of terrorist attacks and other man-made or natural disasters.^{8 9}

The scale of the Olympic Games presents a major challenge for local public health systems. The city of Sydney, for example, received 11,000 athletes from over 200 countries, 5,100 officials, 11,000 media personnel and 100,000 international visitors during the Games in 2000. The city's usual population is just under four million people, meaning that during the games the population increased by over 3%, without even accounting for visitors from within Australia.¹⁰

While health preparedness is central to Olympics planning, existing literature shows that health promotion in the context of Olympic Games can be used effectively for both disease prevention and to promote healthy lifestyles.¹¹ The range of agencies and government departments that are involved in the campaigns (local councils, department of health, Olympics organizing committees, private sponsors) has been shown to affect their effectiveness significantly.¹² The way these agencies interact and co-operate to strengthen and optimise the health promotion campaign is a dimension that relates closely to aspects of the governance of Olympic Games, discussed below. Some Olympics have also seen restrictions on sponsorships from companies selling unhealthy products such as alcohol, which reflects a consistent position of the Games in relation to health promotion. The International Olympics Committee (IOC) does not accept cigarette sponsorship. Finally, some Olympic health promotion campaigns have been strengthened by the development of policies that promote healthy living, such as the designation of smoke-free areas.

Health promotion campaigns with a focus on physical exercise inspired by Olympic Games require careful targeting. Evidence shows that people with the highest participation rates in sport are in the professional socio-economic group, while the unskilled participate the least.¹³ A promotion campaign aimed at increasing the participation rates in sport of certain groups, however, should be developed with a clear understanding of the barriers to participation in sports and possible measures to combat these.

All of these pieces of evidence suggest questions that should be addressed if London is to gain from the available evaluation evidence on mega-events (specifically the Olympic Games). Some of the key questions are shown in Box 1. These questions are ones that can

⁸ Meehan, P., Toomey, K., Drinnon, J., Cunningham, S., Anderson, N., and Baker, E. (1998) 'Public Health Responses for the 1996 Olympic Games', *The Journal of the American Medical Association* 279(18), pp.1469-1473.

⁹ Brennan, R. et al (1997) Op Cit

¹⁰ Jorm, L.R., Thackway, S.V., Churches, T.R and Hills, M.W (2003) 'Watching the Games: public health surveillance for the Sydney 2000 Olympic Games', *Journal of Epidemiological Community Health* 57, pp. 102-108.

¹¹ Soteriades, E. et al (2006) 'Health promotion programmes related to the Athens 2004 Olympic and Para Olympic Games', *BMC Public Health* 6:47.

¹² Ibid.

¹³ Brown, A., and Massey, J. (2001) *The sports development impact of the Manchester 2002 Commonwealth Games: Initial baseline research*, Prepared for UK Sport, Manchester Institute for Popular Culture, Manchester Metropolitan University.

be investigated further using a more in-depth meta-evaluation of evidence on healthcare and mega-events. The answers to these questions can then help London 2012 to ensure an efficient delivery and a long-term legacy of healthcare.

Questions

How can the developments in healthcare provision that take place in the context of a mega-event be translated into sustainable improvements in the healthcare infrastructure for the local population?

How can a holistic policy approach to health and healthcare be developed around a mega-event (e.g. changes in policy around diets in schools being co-ordinated with an Olympics-related health promotion campaign focusing on diet)?

How can care be provided during the Olympics without depleting services for the wider population?

How can the opportunities for effective health promotion be optimized?

How can effective partnerships between agencies be developed around health-related initiatives?

How can the benefits of health-related infrastructure from the Olympics (such as sports centres) and their use by the local population be maximised (e.g. by tackling barriers to their use such as distance and price)?

Box 1. Questions arising from evidence associated with the Olympics and healthcare

2.2 Volunteering: making use of the skills on offer

Olympics observers have long recognised the significant contribution that volunteers make to the successful running of an Olympic Games. The value of volunteering is realized both in terms of direct organisational support and the provision of various services during the Games, and more generally in economic and labour terms that, according to some experts, could even be compared in magnitude with the main sources of financing.¹⁴

In addition to its value in economic terms, as an alternative labour source, volunteering is also seen to have a variety of positive societal outcomes, including the promotion of social inclusion and a stronger sense of citizenship, life-long learning, healthy living and active ageing.^{15,16,17} The UK Government has recognised the strength of the volunteer sector,

¹⁴ Volunteerism Global Society and the Olympic Movement (1999) *Conclusions and Recommendations: International Symposium on Volunteers, Global Society and the Olympic Movement*, Published in the Documents of the Museum collection, International Olympic Committee.

¹⁵ Ralston, R., Lumsdon, L., and Downward, P. (2005) 'The Third Force in Events Tourism: Volunteers at the XVII Commonwealth Games', *Journal of sustainable tourism* 13:5.

¹⁶ Brown, A., and Massey, J. (2001) *The sports development impact of the Manchester 2002 Commonwealth Games: Initial baseline research*, Prepared for UK Sport, Manchester Institute for Popular Culture, Manchester Metropolitan University.

¹⁷ Ralston, R., Lumsdon, L., and Downward, P. (2005) 'The Third Force in Events Tourism: Volunteers at the XVII Commonwealth Games', *Journal of sustainable tourism* 13:5.

setting up the Office of the Third Sector within the Cabinet Office to address issues specific to the charity and voluntary sector.

Although there is limited research into the link between the volunteer experience at Olympic Games and its longer-term impact on the individual and the community, the experience of the Commonwealth Games in Manchester shows an emerging interest in enhancing the legacy of the volunteer experience after the Games. The Post Games Volunteer Project (PGVP) was set up to provide a range of opportunities to people who had volunteered at the Manchester Games and were interested in continuing their involvement. Specific objectives of the project included promoting volunteering as a route to employment; education and training; and support for volunteers' personal development initiatives.¹⁸ While the effectiveness of the programme has not been clearly established, the PGVP is an innovative initiative aimed at ensuring that the volunteer experience at mega-events has a sustainable, long-term impact.

Olympic Games and other mega-events recruit very large numbers of volunteers (Manchester 2002 employed over 10,000, Sydney had over 40,000), and so the profiles and expectations of volunteers are varied. Studies of the Winter Olympics in Norway 1994 and the Sydney Olympics in 2000 showed that, while a large proportion of volunteers were motivated by pride in their country and a desire to contribute and feel 'valued', younger volunteers were more likely to be motivated by the expectation of acquiring skills and contacts that would be useful for future employment.^{19,20}

Another area that requires careful consideration is the diversity of the volunteer body at a mega event. The 1997 National Survey of Volunteering, one of the most important studies of volunteering in the UK, suggests that those aged 45-54 volunteered the most, followed by those over 65. Younger people were less likely to volunteer, even though the experience could be beneficial for skills development and future employment.²¹ In addition, White people are more likely to volunteer than Black or Asian people and members of other ethnic groups. People with higher education levels, from higher socio-economic groups, with a wide network of contacts and who are established residents with attachment to their community, are more likely to volunteer than their counterparts.²² The survey findings point to the importance of developing a sound recruitment strategy that will allow a wider range of people to access the benefits of volunteering.

Some of the key questions arising from the evidence on volunteering identified in this meta-analysis are shown in Box 2. These questions are ones that can be investigated further using a more in-depth meta-evaluation of evidence on volunteering and mega-events.

¹⁸ Ralston, R., Lumsdon, L., and Downward, P. (2005) Op Cit

¹⁹ Kemp, S. (2002) 'The hidden workforce: Volunteers' learning in the Olympics', *Journal of European industrial training* 26:2-4.

²⁰ However, this particular study did not explore any gender, ethnic or other differences in motivations and expectations of volunteers.

²¹ Ralston, R., Lumsdon, L., and Downward, P. (2005) Op Cit

²² Ibid.

Questions

How can the benefits of volunteering be maximised for the Olympics?

How can volunteering be used to create a skilled workforce?

How can London 2012 encourage people outside the ‘usual suspects’ to volunteer?

Box 2. Questions arising from evidence associated with the Olympics and volunteering**2.3 Employment: moving from benefits to benefit**

Researchers have argued that while there are gains in employment to be made from mega-events (as long as the event is well-managed), the economic effects seem to be erratic. For example, while employment might be created in the construction sector (even outside the local area), many small businesses can be evicted from an Olympic site, as occurred during the development of the Olympic village for Barcelona 1992.²³ More importantly, evidence also shows that gains in employment from a mega event are not always sustainable.²⁴

A study of employment generated by the Atlanta and Los Angeles Olympics had illuminating results.²⁵ The study suggests that the economic impact of the Olympics, in terms of employment creation, tends to be transitory rather than long term. The study states that:

[t]his outcome is likely to be true unless great care is taken to ensure that the Olympic infrastructure is compatible with the resident economy. If the infrastructure for the Games lacks synergy, or worse, if it displaces or competes with resident or established capital and labour, then the job gains are likely to be short-lived.²⁶

According to this study, while Atlanta is an example of a host city that attempted to create these synergies, many Olympic Games have led to the development of infrastructure that is infrequently or incompletely utilised.

In Barcelona, there is evidence of a sharp increase in employment in 1986, following the city’s nomination to host the Olympics. The city had suffered a severe recession since 1975, when the country began its transition to democracy. The Olympics were seen as a golden opportunity to revive the economy, with particular emphasis on urban transformation and regeneration that would improve the quality of life and appeal of the city.²⁷ Unemployment rates in Barcelona fell at a much greater rate than in the rest of

²³ Raco, M. (2004) ‘Whose Gold Rush? The social legacy of a London Olympics’, in Vigor, E., Mean, M., and Tims, C. (2004) *After the Gold Rush: A sustainable Olympics for London*, ippr and Demos, UK.

²⁴ See for example: Baade, R., and Matheson, V (2002) ‘Bidding for the Olympics: Fool’s gold?’ in *Transatlantic Sport: The Comparative Economics of North American and European Sports*. C. P. Barros, M. Ibrahim, and S. Szymanski, eds. London: Edward Elgar Publishing, 127-151.

²⁵ Ibid.

²⁶ Ibid. Page 28.

²⁷ Brunet, F. (1995) *An economic analysis of the Barcelona ’92 Olympic Games: resources, financing and impacts*, Centre d’Estudis Olímpics (CEO-UAB), Universitat Autònoma de Barcelona, Spain.

Spain between 1986 and 1992, indicating a possible association between increased economic activity due to the games and the creation of jobs. Table 1 shows unemployment rates in Barcelona and in Spain as a whole in 1986 and in 1992.

Table 1. Unemployment rates (in %) in Barcelona and Spain

	1986	1992
Barcelona	18.4%	9.6%
Spain	Ranged from 18.4 to 23.7%	15.5%

Source: Brunet, F. (1995) *An economic analysis of the Barcelona '92 Olympic Games: resources, financing and impacts*, Centre d'Estudis Olímpics (CEO-UAB), Universitat Autònoma de Barcelona, Spain.

The evidence from Barcelona shows that in 1993 (one year after the Games) only a small proportion of the jobs created before the Olympics were 'lost', and these were likely to correspond directly to the organisation of the Games. While the evidence is not conclusive, the longer-term employment impact could be associated with the fact that the strategy for the Games had been, from the outset, to generate as many projects as possible that would provide return on investment in the longer term. Thus, over 60% of the investment was devoted to the development of road and transportation infrastructure, housing, offices and commercial venues, telecommunications and services, and hotel facilities.²⁸ These, unlike projects directly related to the Games (such as sporting facilities) have had a longer-term structural effect on the city which can be associated with sustained levels of employment.

Such opportunities for employment generation cannot be taken for granted. In East London, high rates of unemployment are not only due to low demand for labour, but also to supply side aspects, such as low skills. The local labour force and its needs must be understood to maximize the impact that a mega event can have on employment.²⁹

This evidence on employment raises a number of questions that can and should be addressed by London 2012 using a more in-depth meta-evaluation (Box 3).

²⁸ Ibid.

²⁹ Crookston, M. (2004) 'Making the Games work: A sustainable employment legacy', in Vigor, E., Mean, M., and Tims, C. (2004) *After the Gold Rush: A sustainable Olympics for London*, ippr and Demos, UK.

Questions

How can organisers ensure that the local population is able to take advantage of the labour opportunities provided by the event (e.g. provision of skills training in various areas where employment is likely to be generated, such as food production, services, construction, transport)?

How do we ensure these opportunities meet population needs in the longer term?

How do we ensure that employers employ from within the area rather than import workers from outside?

Box 3. Questions arising from evidence associated with the Olympics and employment**2.4 Governance and accountability: Ensuring the gold standard**

Olympic governance has become increasingly challenging as the scale and complexity of the Games has risen. ‘Governance’ refers to the organisational modes, processes and instruments adopted to plan and carry out the Olympic Games. Governance concerns both managing a range of individual tasks linked to delivering the mega event (from budgeting to the construction of the physical infrastructure and the actual staging of the event), and coordinating the organisations involved in delivering these diverse individual tasks. While ‘governance’ in this sense is a cross-cutting theme and plays a role in all the substantial issues discussed in this report, our main emphasis here is on the overall organisational set-up and arrangements of responsibility and accountability, including a number of managerial challenges particular to hosting mega-events such as the Olympics. On the basis of existing evidence, we seek to highlight open questions and unresolved problems around aspects of governance, management and delivery of the Olympic Games.

The key challenges of governing the Olympics can be summarised as (1) managing the specific recurring risks of staging the Games, (2) developing effective and inclusive governance arrangements and (3) ‘legacy governance’. These are discussed in more detail below.

Managing recurring risks

Hosting the Olympic and Paralympic Games poses a range of challenging managerial risks, some of them generic to the organisation of such a mega event.³⁰ Among the most important immediate risks are the ‘deadline risk’ and the ‘cost overrun risk’.³¹

The deadline risk arises because the Games have to be delivered against an immovable deadline – which poses a range of crucial management challenges. The last minute completion of facilities in the 2004 Games in Athens is only the most recent example of the difficulty of meeting the deadline.

Cost overruns are a recurring failure in public infrastructure projects, and procurement in general.³² One important cause of cost overruns is the uncertainty of developments

³⁰ Jennings (2005)

³¹ NAO (2007)

between the time of the successful bid and the start of the Games, such as shifting priorities or changes in legislation.³³ For example, a development that was not foreseen when planning the original budget for the London Games is the increasing concern for security. In the light of the terrorist attack on 7 July 2005, an increase in the budget for security measures was regarded as necessary, on top of the contingency fund requested in the bid.

However, cost overruns are not a natural law, as shown by the example of the profit-making Los Angeles Olympics in 1984,³⁴ where low costs were achieved by relying on existing infrastructure. What this suggests, though, is a trade-off between low cost Olympics on the one hand and the creation of a lasting legacy from hosting the Games (for example through urban regeneration) on the other. In that sense, governing the Olympics implies much more than planning and managing a complex event.

Effective and inclusive governance arrangements

With the increasing scope and significance (political, economic and cultural) of the Olympic Games, governance arrangements have become increasingly complex, too. Governance and delivery structures in recent Games include a multiplicity of organisations and groups involved at various levels. While the core governance structure of Olympic Games involves a group of four stakeholders (national government, the IOC, the national Olympic association and the city (regional) government), a range of other actors play a role in relation to funding, supervision and delivery issues.

While increasing participation is a welcome trend in helping to secure the legacies of the Games, having a variety of actors involved makes coordination and management inherently difficult, giving rise to risks of slow decision-making, commitment problems, and a tendency to shift and deflect blame for failures. Since central government will be held accountable by the wider population for large-scale failures, the quest for wider participation clashes with the desire of government to keep control, as well as with the hierarchical relationship established between the IOC and the local organising committee.

Legacy governance: long-term effects and policy agendas

Governing the legacy dimension of the Olympic Games includes planning for the subsequent use of physical infrastructure (sport facilities, housing, transport) and exploring the wider economic, social and environmental benefits. The history of the Games is littered with examples of planning failures concerning the usage of sport facilities, Olympic parks and the housing in the Olympic village.³⁵ The lack of participation of local

³² In Sidney costs increased from an estimation of \$AUS 3.0 billion (£1.0 billion) to \$AUS 6.6 billion (£2.3 billion) (Auditor General of New South Wales (2002): Cost of the Olympic and Paralympic Games, Auditor-General's report to Parliament 2002,

<http://www.audit.nsw.gov.au/publications/reports/financial/2002/vol2/costofolympicgames.pdf>. In London, the budget (costs funded by public sector) already increased from £3.4bn to £9.3bn within two years from 2005 to 2007.

³³ NAO (2007), 16; Gursoy and Kendall (2006)

³⁴ Shoval (2002), 583-84. Avoiding losses was a priority for the hosts of the Los Angeles Games after the loss-making Games of Montreal 1976. Beyond economizing on costs (i.e. infrastructure development), mounting revenues from broadcasting rights also played an important role in achieving a profit.

³⁵ Further discussion of this topic can be found in sections 2.8 and 2.9.

(government) organisations and the wider local community has been regarded as a major factor behind such planning failures, in particular in the context of the ‘over-commercialized’ US Olympics in the 1980s and 90s.³⁶

Evidence in particular suggests that delegated governance arrangements, e.g. special purpose and temporary agencies responsible for bidding and staging the Olympics, can cause discontinuities, contradictions and conflicts between the original objectives of staging the event and its final outcomes and legacies.³⁷ Early and continuous inclusion of local government is therefore a crucial condition for successful legacy governance.

The governance of the Olympics is shown by this meta-analysis to be a multifaceted problem, which raises questions that current evaluation evidence can help to answer (Box 4). Since this meta-evaluation is so wide-ranging, these specific questions on governance will benefit from a more focused investigation into Olympic governance issues.

Questions

How can organisational structures be designed that allow tight control over ‘delivery’ issues and quick decision-making, while at the same time being inclusive in engaging a range of stakeholders?

How could governance structures facilitate flexibility and learning within the system in the course of planning and preparation of the Games?

Which procedures and mechanisms are effective instruments for developing a ‘legacy strategy’ that explores wider social and economic benefits?

How can biased ex-ante assessments of cost and benefits be avoided and realistic, evidence based cost benefit assessments carried out without undermining support for the Games (or the bid)?

Which rules, institutions and incentives could encourage transparent and realistic budget calculations?

Box 4. Questions arising from evidence associated with the Olympics and governance

2.5 Economic development: Spreading the benefits

Prior research into the economics of the Olympics has been careful to distinguish between the financial performance of the Games’ organisers and the wider economic benefits that accrue from hosting such an event. The latter can include effects on the local economy through visitor expenditure, the developmental acceleration achieved in deprived areas through infrastructure investments, and the legacy of increased tourism and business traffic as a result of the host’s massive media exposure.³⁸

³⁶ Andranovich, Burbank and Heying (2001) ‘Olympic Cities: Lessons Learned from Mega-Events Politics’, *Journal of Urban Affairs*, 23(2), p128.

³⁷ This has been particularly evident in the US Olympics analysed by Andranovich, Burbank and Heying (2001).

³⁸ Blake (2005) *The Economic Impact of the London 2012 Olympics*, Nottingham University Business School, p.4.

Unfortunately, the extent of such wider economic benefits has usually been the subject of rhetoric, rather than objective research. As one commentator remarked recently, ‘given its enormity, it is somewhat surprising that neither the Olympic industry nor its detractors have seriously investigated the costs and benefits of hosting the games’.³⁹ Claims and counter-claims from both sides abound, but robust, independent studies remain thin on the ground.⁴⁰ It is often difficult to investigate the economic impact of mega-events in detail because organisers disperse after their tasks are completed, and governments move on to other projects.⁴¹

Nevertheless, the need for objective analysis is all the greater given that recent experience suggests that organisers and locals may experience a psychological ‘feel-good factor’ in the run-up to a Games that makes even the most monumental expenses appear worthwhile.⁴² For example, in the period 1990-2000, it is estimated that the Sydney Olympics received AUS\$1.2 billion of private investment and AUS\$2.3 billion of public investment, equivalent to 0.06% of Australia’s GDP over that period.⁴³ There is thus the potential that ‘negative impacts are either ignored or hidden under the table’.⁴⁴

Although every successful Olympic bid since 1984 has been the subject of a cost-benefit analysis, these analyses are often based on greatly simplified models of the economy in question that may rest on unsound assumptions or limited information – for example, a lack of clarity over the exact direct spending on the event.^{45,46} In fact, it is surprising how little research has revisited *ex-ante* studies to assess their predictions in the light of actual events.

Those projects that do address this issue often conclude that benefits were over-estimated, to the extent that some reviewers believe that it is now ‘fairly predictable’ that there will be ‘significant gaps between the benefits forecast for sports-projects, and the ensuing

³⁹ Booth (2001) ‘Economics of the Olympic Games: Hosting the Games 1972-2000 by Holger Preuss (Review)’ *Olympika: The International Journal of Olympic Studies*, 10, 87-92, 87.

⁴⁰ Two notable exceptions are Flyvbjerg, Bruzelius and Rothengatter, (2003) *Megaprojects and Risk*. Cambridge: Cambridge University Press, and H. Preuss (2004) *The Economics of Staging the Olympics: A Comparison of the Games 1972-2008* London: Edward Elgar.

⁴¹ Hiller (1998) ‘Assessing the Impact of Mega-Events: A Linkage Model’, *Current Issues in Tourism* 1:1, 47-57, p.48.

⁴² Hodgkinson, ‘London 2012 must learn from the £1bn Sydney hangover’, *The Daily Telegraph* 8 February 2007, pp.S10-11.

⁴³ Chalip (2002): *Using the Olympics to optimise tourism benefits: university lecture on the Olympics*. Barcelona: Centre d’Estudis Olímpics (UAB), p. 1. <<http://olympicstudies.uab.es/lectures/web/pdf/chalip.pdf>>

⁴⁴ Hiller (1998) Op Cit, pp.47-48.

⁴⁵ Kasimati (2003) ‘Economic Aspects and the Summer Olympics: A Review of the Related Research’, *International Journal of Tourism Research* 5:433-444, p.434, p.437.

⁴⁶ Clarke (2004) *Evaluating Mega-Events: A critical review*, Presentation at conference on “The Impact and Management of Tourism-related Events”, Nottingham Business School, p. 4. <http://www.nottingham.ac.uk/ttri/pdf/conference/alanclark.pdf>

legacies'.⁴⁷ However, it appears that the post-Sydney study by PriceWaterhouseCoopers broadly supports the claims of *ex-ante* studies by KPMG and Arthur Andersen that Australia would experience GDP boosts of AUS\$7.1 billion (1990/1 dollars) and AUS\$6.1 billion (1998 dollars) respectively.⁴⁸ These vast sums of money, the political capital they represent, and the inherent complexity in comparing actual outcomes to *ex-ante* studies that are often completed many years before the events in question, and which may use wildly differing economic models, have all made assessing the economic impact of the Olympics into a highly contentious issue.

Although there are clearly a huge number of questions around the economic impacts of the Olympics, we feel that the majority of these are the sorts of cost-benefit calculations that are the preserve of financial consultancies. As RAND Europe is interested in how this evidence can be used, the questions that arise from economic analysis of Olympics are ones that involve the use of evidence in policy making (Box 5).

Questions

How can the evidence of economic impacts produced by past Olympic Games be used to estimate the benefits of the London Games in a reliable manner and thereby strengthen public support for the event?

Box 5. Questions arising from evidence associated with the Olympics and economic impacts

2.6 Tourism: Competing in a world class field

Tourism is particularly significant for London because, regardless of the 2012 Games, it is one of the world's major tourist destinations: total tourism spending amounts to £15 billion, and supports 280,000 jobs in the capital.⁴⁹ It is often asserted that hosting the Olympics offers a massive boost to tourism and the visitor economy – it is claimed that London's windfall will be in the region of £2 billion, while tourism accounted for 44.6% of the total projected economic impact of the Sydney Games.⁵⁰ Given the fact that tourism is often placed at the heart of the Games' predicted economic impact, some research has

⁴⁷ Whitson and Horne (2006) 'Underestimated costs and overestimated benefits? Comparing the outcomes of sports mega-events in Canada and Japan' *The Sociological Review* 54:2, 71-89. See also Baade and Matheson (2002).

⁴⁸ KPMG (1993) Sydney Olympics 2000 Economic Impacts Study; Arthur Andersen (1999) *Economic impact study of the Sydney 2000 Olympic Games*, Centre for Regional Economic Analysis, University of Tasmania; PriceWaterhouseCoopers (2002) *Business and Economic Benefits of the 2000 Sydney Games – A collation of evidence*, Executive Summary.

⁴⁹ <http://www.lta.gov.au/server/show/ConWebDoc.1520>

⁵⁰ VisitBritain (2005) Press Release 6 July 2005.

http://www.visitbritain.com/corporate/presscentre/presscentrebritain/pressreleasesoverseasmrkt/apr_jul2005/olympics_win.aspx; Figures from the Tourism Forecasting Council in Australia, quoted in Chalip (2002), p.6.

expressed surprise that ‘the amount of research aimed at evaluating those impacts is surprisingly limited’ (although it has increased greatly since 2000).⁵¹

The research that has been conducted shows that not only are there are many opportunities for bias and error to enter the estimates of tourism impact,⁵² but that there is a fundamental debate over whether a link between hosting sports mega-events and increased tourism actually exists.⁵³ For example, there is a strongly-held view that fear of overcrowding and disruption during the Olympics may deter visitors who would otherwise have visited London. Research into Australia’s international tourist markets prior to 2000 revealed a perception that ‘Sydney will be full in 2000 because of the Olympics’, and therefore must be avoided for the entirety of that year,⁵⁴ while 66% of Danish tourists avoided the Lillehammer region during the 1994 Winter Olympics.⁵⁵

Added to such fears is the evidence that suggests that visitors to mega-events have different spending and behaviour patterns from regular tourists: ‘they are not interested in “tourism” – they are interested in sport... they tend not to spend money on leisure and entertainment, and when not in stadia they watch events on TV rather than engaging in other activities’.⁵⁶ This view is supported by figures that reveal in Los Angeles, attendance figures at popular tourist destinations were down 30-50% during the 1984 Olympics.⁵⁷ The situation appears even bleaker if one considers that the MICE (meetings, incentives, conventions and exhibitions) visitors who may be driven away from London by the Games actually outspend leisure tourists by a margin of seven to one.⁵⁸

Although some observers would declare that ‘the principle legacy of Olympic Games is one of disappointment’, the evidence is far from clear and demands careful study.⁵⁹ In Barcelona, overnight stays increased from under 4 million a year in 1990 to over 10 million in 2004, while tourism’s share of the city’s GDP increased from 1-2% to over 12% in the same period.⁶⁰ In contrast, Sydney experienced the combined effects of falling

⁵¹ B. Faulkner, et al. (2000) ‘Monitoring the Tourism Impact of the Sydney 2000 Olympics’, *Event Management* 6:4, 231-246, 231; Clarke (2004).

⁵² Clarke (2004) Op Cit, p.5.

⁵³ European Tour Operators Association (2006) Olympic Report. <http://www.etoa.org/Pdf/ETOA%20Report%20Olympic.pdf>.

⁵⁴ Chalip (2000) Op Cit, p.5.

⁵⁵ Getz (1997), ‘The impacts of Mega-events on tourism: Strategies for destination’, in Department of Tourism Studies (ed.), *The Impact of Mega-events, Papers of the Talk at the Top Conference (Jul 7-8)*. Quoted in Holger Preuss (2004), *Aspects of Olympic Games Tourism*. http://www.sete.gr/files/Ekdiloseis/041012_HolgerPreuss.pdf

⁵⁶ European Tour Operators Association (2006) Op Cit, p.9.

⁵⁷ Economics Research Associates (1984), *Community Economic Impact of the 1984 Olympic Games in Los Angeles*

⁵⁸ Chalip (2000) *Leveraging the Sydney Olympics for tourism*, Barcelona: Centre d’Estudis Olímpics UAB, p.5. http://olympicstudies.uab.es/pdf/wp096_eng.pdf

⁵⁹ European Tour Operators Association (2006) *Welcome> Legacy, The Tourism 2012 Strategy Consultation Evidence Submission*, p.1. <http://www.etoa.org/Pdf/ETOA%20Response%20to%20Welcome%20legacy.pdf>

⁶⁰ European Tour Operators’ Association (2006), p.11.

demand for hotel rooms and increased bedstock, international visitors to Sydney decreased for three years following the Games, and 10 hotels were closed between 2000 and 2006.^{61,62}

Given the above evidence from this meta-evaluation, a number of key questions arise (Box 6). These are ones that can be answered through an analysis of the impact of mega-events on tourism more specific than the current wide-ranging meta-analysis.

Questions

Given that tourism for the Games will be very significant in economic and logistical terms, how can reliable estimates of the scale of tourism produced by the Games be applied in practice to ensure that the city is fully prepared?

What attitudes do potential tourists adopt to the staging of the Games in London in 2012? If the Games alter the constitution of tourists visiting London, what will the economic effects of this alteration be?

What will be the tourism legacy of the Games for London, and how can public and private organisations ensure that London does not produce excess tourism capacity or a capacity shortage?

Box 6. Questions arising from evidence associated with the Olympics and tourism

2.7 Transport: More than just A to B

Examining previous mega-events is particularly beneficial for transportation studies because they effectively offer “real scale” laboratories of alternate mobility patterns and travel behaviour.⁶³ Transportation is one of the most important practical challenges to face an organising committee – if spectators and athletes cannot arrive at venues on time, the event will collapse. The scale of operations needed to provide adequate Olympic transportation is vast, Atlanta employed approximately 15,500 transportation staff, Sydney spent more than AUS\$370m on transport, and an estimated 21.7m passenger trips were conducted during the Athens Games.⁶⁴

The challenge is even greater if the Olympic organising committee takes on full responsibility for providing spectator transportation during the Games, a task that proved

⁶¹ *Ibid*, p.15.

⁶² See also: Chalip (2002), p.7; Ritchie (2000) 'Turning 16 days into 16 years through Olympic legacies.' *Events Management* 6(3): 155-165; Tourism Alliance (2006) *Culture Media and Sport Select Committee Evidence: Preparations for the London 2012 Olympic and Paralympic Games*, Section 3; Baade and Matheson (2002).

⁶³ Bovy (2001) 'Transport and exceptional public events: Mega sports event transportation and main mobility management issues', Economic Research Centre, Round Table 122, p.5.

⁶⁴ IOC (1997), 'The Official Report of the Centennial Olympic Games; Volume One: Planning and Organizing', p.500; IOC (2001), 'Olympic Report of the XXVII Olympiad; Volume One: Preparing for the Games', p.157; Dimitriou *et al.* (2005) 'Public Transportation during the Athens 2004 Olympics: Facts, Performance and Evaluation', in 'Athens 2004 Summer Olympics: A Compendium of Best Transportation Practices' (CD-ROM), published by the Hellenic Institute of Transportation Engineers, p.2.

‘extremely challenging’ in Atlanta.⁶⁵ For example, the Sydney Games ensured that spectators with tickets, the Olympic workforce and volunteers (who amounted to 150,000 people daily) were entitled to free 24-hour transport to Olympic venues. No car parking was provided at any Olympic venue in order to reduce road traffic, which meant that rail traffic grew from 14 million to 29.5 million during the period of the Games.^{66 67}

One of Sydney’s particularly useful initiatives was to test the Olympic Park’s public transport system prior to the Games – over a period of two and a half years, 3.9 million people travelled to the Olympic Park for test events.⁶⁸ These tests resulted in major operational improvements, mainly in crowd management both within the public transport system and at Olympic cluster entrances. In contrast to this careful testing, the transport infrastructure for Athens 2004 was late in being delivered and therefore “teething” problems had to be resolved while the project was already carrying paying passengers’, which produced negative press coverage.⁶⁹ Athens nonetheless had a significant transport legacy, which included new suburban rail and light rail systems, renovations to the metro system, and a new international airport.⁷⁰

It is clear that the legacy of an effective, well-utilised transportation system is now one of the major goals of hosting the Olympic Games. This is reflected in the London 2012 Organising Committee’s statement that “providing a sustainable legacy is at the very heart of the project”.⁷¹ In 2007, the House of Commons Transport Committee commented that the available evidence made this commitment appear ‘unconvincing’ and voiced ‘concern’ at the importance being attached to the legacy issue.⁷²

Transport is one of the most important aspects of London 2012, as shown by the London 2012 Organising Committee’s statement on legacy (above). As such, it is important that the evidence from previous mega-event evaluations informs the questions that need to be asked for London 2012’s sustainable transport legacy. On top of questions that can be addressed using evidence from a transport based meta-analysis (Box 7), there are primary research methodologies that can be applied specifically to transport questions and Chapter 3 identifies some of the modelling techniques that would be applicable to transport problems faced by London 2012.

⁶⁵ IOC (1997), p.522.

⁶⁶ Bovy (2006), ‘Solving outstanding mega-event transport challenges: the Olympic experience’, *Public Transport International* 6/2006, pp.32-34, p.32.

⁶⁷ Ibid

⁶⁸ IOC (2001), p.157.

⁶⁹ Nellas (2005) ‘The Athens LRT – Fast Track Olympic Implementation and High Quality Daily Transport’, in *Athens 2004 Summer Olympics: A Compendium of Best Transportation Practices*, p.1.

⁷⁰ Bovy (2006) Op Cit, p.33.

⁷¹ <http://www.london2012.com/en/ourvision/regeneration>

⁷² House of Commons Transport Committee (2007) ‘Transport for the London 2012 Olympic and Paralympic Games: The Draft Transport Plan’, pp.5-6.

Questions

How do organisers avoid ‘re-inventing the wheel’ due to lack of knowledge about past Olympic transport initiatives?

How do we ensure that the event-specific Games transportation is integrated with the existing transport system, responds to current and future transport needs, and has appropriate pre-Games testing?

How do we ensure that the transport legacy produced by the Games is both sustainable and suitable for London’s future transport needs?

Box 7. Questions arising from evidence associated with the Olympics and transport

2.8 Regeneration: A new hope

The Chief Executive of London 2012’s Olympic Delivery Authority recently emphasised the Games’ importance as a catalyst for revitalising the Lower Lea Valley, claiming that London could be remembered as the “Regeneration Games”.⁷³

Although there has been ‘little research on the actual regenerative potential of investment in sport’,⁷⁴ some evidence shows that hosting the Olympics can massively advance the regeneration of previously derelict areas, and even create new metropolitan centres. For example, hosting the Olympics meant that not only was the planned regeneration of Sydney’s Homebush Bay brought forward significantly, but also its scope was greatly increased, for example a new rail line was added. The resulting development replaced degraded industrial land with Sydney’s largest urban park, the Millenium Parklands, constituting 450 hectares of wetlands and grasslands habitats.

However, as well as advancing the timetable and widening the scope of Homebush Bay’s regeneration, the Olympics also changed its nature: the planned industrial areas disappeared, and the whole enterprise was oriented towards spectator venues and major commercial and retail development.⁷⁵ It is suggested that city authorities wish to use mega-events to expand into the arena of consumption-based rather than production-based economic development because they believe that convention centres will attract tourists and promoting professional sports will trigger urban regeneration and growth.⁷⁶ However, some argue that consumption-based developments create apparently uniform constellations of convention centres, hotels and entertainment complexes, all of which are aimed at improving the experience of *visitors*, rather than residents.⁷⁷

⁷³ <http://sport.guardian.co.uk/london2012/story/0,,1954761,00.html>. Accessed on 12.02.07.

⁷⁴ Hall (2006) ‘Urban entrepreneurship, corporate interests and sports mega-events: the thin policies of competitiveness within the hard outcomes of neoliberalism’, *The Sociological Review* 54 (s2), 59-70, 62.

⁷⁵ The information about Homebush Bay is found in Searle (2002), ‘Uncertain Legacy: Sydney’s Olympic Stadiums’, *European Planning Studies* 10:7, 845-861, p.850.

⁷⁶ Andranovich, Burbank, and Heying (2001) Op Cit

⁷⁷ Andranovich, Burbank, and Heying (2001) Op Cit, 116.

Moreover, when assuming that while ‘major sports teams and events are “community assets”’ one has to be aware of the fact that ‘stadia often exist in close proximity to citizens who cannot afford the price of admission and upon whom the burden of increased taxation is disproportionately placed’, as has been the case of the Superdome in New Orleans.^{78,79} It has been argued that the Nagano Winter Olympics (dubbed ‘the construction firm Olympics’) made few improvements to public infrastructure and left little-used facilities that incur heavy operational losses, while stated social goals remain uncompleted.⁸⁰ Other studies also point out that various mega-events have led to social polarisation due to the subsequent development of the housing market. For example, low-cost housing had been promised in both Barcelona 1992 and Sydney 2000, but property prices and rents of these new homes increased to such an extent that the area became unaffordable to lower income groups.⁸¹ The distributional aspects of investment and growth around an Olympics are a key issue in assessing the net benefits of the Games and its regeneration projects to the local population.

This leads to a fundamental question raised by recent Olympics: how much does the local area actually benefit from hosting the Games? Clearly, there must be some disadvantages, as evidence of evictions and arrests prior to the Seoul, Barcelona and Atlanta Games suggests.⁸² An honest forecast of who will benefit from the public funds that are mobilised is needed. The House of Commons Committee overseeing London 2012 has recently stated that the increased land values that will result from Olympic regeneration ‘should not simply be translated into a profit for the owners or developers’.⁸³ This is important because one of the major factors affecting local acceptance of a mega event is whether the benefits and negative impacts are distributed ‘fairly’ across society.⁸⁴ These are issues that raise specific questions about how regeneration should or could affect London. Some of these questions (Box 8) can be addressed by a more in depth analysis of regeneration activities which would identify potential solutions that could be used by London 2012 to ensure that the regeneration of London is one that achieves the policy aims it has set out to.

⁷⁸ Schimmel (2006) ‘Deep play: sports mega-events and urban social conditions in the USA’, *Sociological Review*, p 160-174.

⁷⁹ Whitson and Horne (2006). ‘Underestimated costs and overestimated benefits? Comparing the outcomes of sports mega-events in Canada and Japan’ *The Sociological Review* 54:2, 71-89, 75.

⁸⁰ Ibid

⁸¹ Horn and Manzenreiter (2006) ‘An introduction to the sociology of sports mega-events’, *The Sociological Review*, 54(s2), 1–24, p 12.

⁸² Shapcott (1998) ‘Commentary on “Urban mega-events, evictions and housing rights: The Canadian case” by Chris Olds’, *Current Issues in Tourism* 1 (2), 195–196.

⁸³ House of Commons Culture, Media and Sport Committee (2007) *London 2012 Olympic Games and Paralympic Games: funding and legacy. Second Report of Session 2006-7. Volume One*, p.4.

⁸⁴ Jones (2001) ‘Mega-events and Host-region Impacts: Determining the True Worth of the 1999 Rugby World Cup’, *International Journal of Tourism Research*, 3:241-251, p.243.

Questions

How can regeneration activities be balanced between fulfilling the needs of visitors to the Olympic sites and the needs of those who live in such areas?

How do we prevent the Olympics from creating perverse or negative effects on the London housing market that disadvantage vulnerable groups?

How do we ensure a situation where the inhabitants of London contribute to an event that creates tangible benefits for the city and its residents?

Box 8. Questions arising from evidence associated with the Olympics and regeneration

2.9 Land Use: Building physical strength for London

Some cities, particularly Barcelona, have demonstrated that hosting the Olympics can be a way to rethink the urban profile of a city and the way it uses space. In Barcelona, the transformation of waterfront areas into a multi-use area, including residences, infrastructures, public spaces and new beaches, has been particularly startling.⁸⁵ By creating 'central' urban areas in a location previously regarded as inaccessible, the waterfront project indelibly altered the city's infrastructure and became key to its rising reputation as a world tourist destination. The example of Barcelona shows the benefits that can ensue if the Olympics are treated as a catalyst for further urban growth and a generator of urban strategies, rather than just a sporting event.⁸⁶

Nevertheless, the Olympics remain primarily a sporting event, and thus require sporting facilities. Sports stadia have often formed part of urban strategies, on the basis that they are part of the infrastructure needed for a city to expand its economic activity into new sectors and transform its image.⁸⁷ However, given the number of new Olympic sports introduced under the Presidency of Juan Antonio Samaranch (1980-1999), the scale of the facilities now needed for the Olympics has made it more difficult for cities to ensure that the resulting expensive, specialist facilities will attract enough users to make them financially sustainable afterwards.⁸⁸ The facilities can attract massive spending. The Atlanta Committee for the Olympic Games, for example, spent approximately \$1.58 billion, of which \$517 million was spent on construction. Of this \$517 million, 40.4% went towards a new Olympic Stadium, and a further 24.6% to the athletes' village. These projects had a major effect on communities, which led to controversy over their development and opposition by residents, often intersecting with race and class issues.⁸⁹ In addition, the benefits produced by these new facilities may be counteracted by the closure

⁸⁵ Muñoz (2006) 'Olympic urbanism and Olympic Villages: planning strategies in Olympic host cities, London 1908 to London 2012', *The Sociological Review* 54 (s2) 175-187, p182.

⁸⁶ Ibid, p185.

⁸⁷ Thornley (2002) 'Urban Regeneration and Sports Stadia', *European Planning Studies* 10:7, 813-818, p.814.

⁸⁸ Higham (1999) 'Commentary – Sport as an Avenue of Tourism Development: An Analysis of the Positive and Negative Impacts of Sport Tourism', *Current Issues in Tourism* 2:1, 82-91, p.85.

⁸⁹ Andranovich, Burbank, and Heying (2001) Op Cit, p122.

or movement of existing facilities that are not directly replaced by the new developments. For example, two swimming pools were closed in East Manchester during the build-up to the 2002 Commonwealth Games.⁹⁰

The experience of Sydney offers a warning about the post-Games viability of such stadia. The troubled Stadium Australia, for example, has been severely handicapped by a lack of suitable events for its capacity, by relatively small Sydney attendances for national sporting leagues, and by significant competition from nearby, pre-existing State Government stadia. It has also been argued that planners failed to consider whether Sydney's long-term recreational and entertainment needs required these facilities.⁹¹ Sydney 2000 also shows that the involvement of private sector enterprises does not eliminate risks of this nature, since their expectations may be inaccurate. In Atlanta, the diving and baseball facilities were eventually torn down owing to a lack of utilisation. However it should be noted that in Atlanta the Olympic athletics stadium was converted for professional baseball.⁹²

It is obvious that regeneration and land use conjure up some of the same questions in terms of policy for London 2012, however, some specific questions do relate to land use (Box 9). By understanding the impact of previous mega-events on land use in particular, the questions in Box 9 will allow London to more effectively plan the legacy of its land use strategy.

Questions

How can the Olympics be a true catalyst for urban growth and innovative urban strategies?

How do we ensure that there will be a long-term, efficient use of the sporting facilities (such as when Manchester City FC took over the City of Manchester stadium constructed for the 2002 Commonwealth Games)?

Box 9. Questions arising from evidence associated with the Olympics and land use

2.10 Environment: The greenest games

Research into the relationship between the Olympics and the environment was limited until David Chernushenko published his *Greening our Games: Running Sports Events and Facilities That Won't Cost the Earth* in 1994.⁹³ This coincided with the addition of a paragraph to the Olympic Charter that required hosts to 'encourage and support a responsible concern for environmental issues, to promote sustainable development in sport and to require that the Olympic Games are held accordingly'.⁹⁴ The awarding of the 2000

⁹⁰ Spring (2003) 'The Social Impact', *Recreation* 62:6, 36-38.

⁹¹ Searle (2002) *Op Cit*, p.845, p.858.

⁹² Chalip (2002) *Op Cit*, p.6.

⁹³ Chernushenko (1994) 'Greening our Games: Running Sports Events and Facilities That Won't Cost the Earth', Ottawa: Centurion Publishing & Marketing.

⁹⁴http://multimedia.olympic.org/pdf/en_report_122.pdf;
<http://www.olympic.org/uk/organisation/commissions/environment/>

Olympics to Sydney, whose bid highlighted environmental goals, stimulated extensive research and commentary on the Games' environmental impact throughout the 1990s. This focused on two main issues: pollution control of soil, sediment and water; and the protection of biodiversity.⁹⁵ Despite some concerns over the cleanup of toxic elements at the Homebush Bay site, the Sydney Olympics subsequently won the mantle of the 'Green Games'.⁹⁶ However, it did not meet the IOC's tough challenge that hosting an Olympics should have no negative net impact on the environment.⁹⁷

Despite the increasing global interest in environmental issues, there is still limited research on this aspect of the Olympics, particularly studies that do not focus on the Sydney Games. Campaign groups such as Greenpeace and the World Wildlife Fund have started to take the lead in this area, and have developed a scorecard to assess the green credentials of a particular Olympic Games. Athens 2004 received a markedly low score.⁹⁸ This may signal the start of an oppositional phase that pits campaigning groups against organisers, and which makes the need for impartial research even greater. In this context, it is surprising that as of December 2005 'no formal assessment of the environmental impacts of the Olympics ha[d] been undertaken either at the London or the UK level'.⁹⁹

Because so little research has been done on the issue of the Olympics and the environment, and the fact that since the games only occur on a four-year basis, investigations into climate change and the Olympics have yet to appear. This could be a particularly important issue, since the large number of tourists and competitors flying into London for the games will have a considerable carbon emissions total. This area would benefit from a study looking at carbon emissions, but is not part of the meta-evaluation due to a lack of research evidence in place to collate. The sorts of questions that do arise from the meta-evaluation of the environment are shown in Box 10.

⁹⁵ Lenskyj (1998) 'Green Games or Empty Promises? Environmental Issues and Sydney 2000', *The Fourth International Symposium for Olympic Research*, p.173.

⁹⁶ Prasad (1999) 'Environment', in Richard Cashman and Antony Hughes (eds.) *Staging the Olympics: The Event and its Impact*, University of New South Wales, pp.83-92.

⁹⁷ Vigor, Mean and Tims (eds.) (2004) *Op Cit*, p.xii.

⁹⁸ <http://www.greenpeace.org/international/news/athens-disqualified-from-green;>
[http://assets.panda.org/downloads/olympicsscorecardenglish.doc;](http://assets.panda.org/downloads/olympicsscorecardenglish.doc) <http://www.msnbc.msn.com/id/5333291/>

⁹⁹ DCMS and PriceWaterhouseCoopers (2005) 'Olympic Games Impact Study: Final Report', p.16.
<http://www.culture.gov.uk/NR/rdonlyres/E88F2684-F49E-4F45-B826-2F19F21374F8/0/OlympicGamesImpactStudy.pdf>

Questions

How can the overall environmental impact of staging the Olympic Games be minimised in order to attempt to fulfil the IOC's desire that the Olympics produce no negative net environmental impact?

Given that the issue of carbon emissions has become increasingly high-profile, how can Olympic organisers best mitigate or offset its carbon footprint?

How can disruption to eco-systems and contamination of the surrounding areas created by construction prior to the Games and during the event itself be minimised?

Box 10. Questions arising from evidence associated with the Olympics and the environment

2.11 Civic engagement: The people's games

Civic engagement can be defined as citizens' participation in decision-making, through voting, volunteering or participating in, for example, community interest groups, and is deemed to be of particular relevance at the local or community level.¹⁰⁰ Civic engagement is seen as an important part of mega event planning, with residents in an area more likely to view a project positively if they feel that they are part of the process or can trust the event organisers.¹⁰¹

London has been proactive in involving the public at an early stage, employing a Community Communications Manager during the bidding process to ensure local residents' views, concerns and hopes were taken into account. This role included organising events with local community groups and residents.¹⁰² Mike Lee, London 2012's Director of Communications and Public Affairs, has often stated the importance of the public in the London Bid:

The support and involvement of the local community is vitally important to the campaign to bring the Olympics to London. Community engagement is part of the planning process for the Games bid, and will ultimately help inform the entire blueprint for the Olympic-inspired regeneration of the Lower Lea Valley.¹⁰³

Several events (Los Angeles, Atlanta, Salt Lake City) saw limited to non-existent citizen participation in the bid, but used rhetoric, such as to 'uplift the people of Atlanta and fight poverty', without any follow-up action. In these cases, citizen participation was essentially reduced to opposition from resident or interest groups to specific projects after the bid had been accepted.¹⁰⁴

¹⁰⁰ Lyons Enquiry into Local Government (2006) 'National prosperity, local choice and civic engagement: A new partnership between central and local government for the 21st century', available at: <http://www.lyonsinquiry.org.uk/docs/20060504%20Final%20Complete.pdf>

¹⁰¹ Waitt (2003) 'Social Impacts of the Sydney Olympics', *Annals of Tourism Research*, Vol. 30. No.1, p196.

¹⁰² <http://www.london2012.com/en/news/archive/2003/december/2003-12-03.htm>

¹⁰³ <http://www.london2012.com/en/news/archive/2003/october/2003-10-15.htm>

¹⁰⁴ Andranovich, Burbank and Heying (2001) Op Cit

Involving the public in London 2012 is clearly an important issue, and by identifying the evidence on engaging communities in previous mega-events, it is possible to answer a range of policy questions (Box 11) that could help London to be a truly engaged Olympics.

Questions

How can mega-events contribute to social cohesion and to a strengthening of the social networks within a community?

What are the methods to ensure representation of the range of social groups within the community in any engagement activities?

What activities have been successful in engaging traditionally hard to reach groups through mega-events?

Box 11. Questions arising from evidence associated with the Olympics and civic engagement

2.12 Multiculturalism: Celebrating Britain's diversity with the world

There is no extensive research into the effects of mega-events on immigration, integration and multiculturalism. Limited research has been conducted on the contribution of sport to multicultural dialogue and the integration of migrants,¹⁰⁵ including a claim for linking volunteerism and multiculturalism.¹⁰⁶ In London, the Muslim Council of Britain (MCB), which represents more than 400 Muslim organisations in the UK, has provided direct support for the bid, highlighting the potential for showing off the multicultural nature of the UK: 'We want to play an active role in welcoming visitors and ensuring a London 2012 Games are fully reflective of our multi-cultural, multi-faith society.'¹⁰⁷

However, it has been reported that several cities saw the introduction of migrant workers for Olympic construction projects. According to The Telegraph, as Athens attempted to finish its Olympic venues, they employed 'an army of illegal foreign workers' under dangerous working conditions.¹⁰⁸ In the preparation for Beijing 2008, local newspapers have reported that the government has discussed plans to expel rural migrant workers, many of whom are working in construction, during the Games,¹⁰⁹ and Human Rights Watch reported that schools for migrant children were closed due to a 'Pre-Olympic Clean-Up'.¹¹⁰ Although there is little evidence available around the Olympics specifically

¹⁰⁵ EC (2004) 'Studies on Education and Sport – Sport and Multiculturalism (Lot3)', available at: <http://www.sportdevelopment.org.uk/eusportmulticultural2004.pdf>

¹⁰⁶ Karlis (2003) 'Volunteerism And Multiculturalism: A linkage For Future Olympics', *Sports Journal*, 6(3), available at: <http://www.thesportjournal.org/2003Journal/Vol6-No3/Volunteerism.htm>

¹⁰⁷ <http://www.london2012.com/en/news/archive/2004/november/2004-11-25-14-25.htm>

¹⁰⁸ Alderson and Field (2004) 'Greece calls up army of illegal workers to get Olympic venues completed on time' in the Telegraph

<http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2004/08/01/woly01.xml&Sheet=/portal/2004/08/01/ixportal.html>

¹⁰⁹ Human Rights Watch. <http://hrw.org/english/docs/2006/09/26/china14263.htm>

¹¹⁰ <http://hrw.org/english/docs/2006/09/26/china14263.htm> (visited last on 07/02/2007).

and its impact on multiculturalism; there is the possibility of answering further questions about the subject by looking at how policy changes can be integrated into Olympic policy to ensure the diversity of London and the UK is celebrated by the London Games (Box 12).

Questions

How can the Olympics help a sustainable climate of community identity be created in a multicultural environment?

How can the integration of migrant workers for the Olympics be done in a sustainable fashion?

Box 12. Questions arising from evidence associated with the Olympics and multiculturalism

2.13 Security: Understanding the risks

Olympic security must consider all aspects of the actual and potential threats. If such an integrated and holistic approach is not employed, organisers may fail to perceive how the Games are vulnerable to events that fall outside the parameters of conventional security thinking.

The security threat is diverse and wide-ranging. It encompasses a time-scale that is far greater than the period of the Games themselves and a geographical span that is far broader than the Olympic sites and venues. Similarly, the threat may originate from multiple sources with varying levels of organisation, from loosely connected associations to tightly coordinated teams. In essence, the security threat arises from three main areas: terrorism, targeted disruption and serious crime. These categories are not clearly delineated and there can be overlaps between them.

Terrorism at the Olympics

The Olympic Games have been subject to terrorist attacks on two occasions. The first was in Munich, West Germany, between September 5th and 6th, 1972, when the Israeli team were attacked in the Olympic Village by a terrorist group called Black September. This resulted in the death of eleven Israeli athletes and coaches, and all of the terrorists. The second took place in Atlanta, USA on July 27th, 1996. A pipe-bomb concealed in a rucksack was planted in the Centennial Olympic Park in Atlanta, Georgia, an area in continuous use as a venue for live music acts. In this attack, one person was killed and 100 were injured. No claim of responsibility was made. Terrorist attacks have been carried out during other major sporting events, such as the IRA attack in Manchester during the EURO 96 Football Championship.

These events illustrate the wide spectrum covered by the fields of terrorist organisation, motivation, objectives, targeting and tactics. It is therefore critical that the security arrangements for the London Games are comprehensive and flexible enough to reduce the overall risk from terrorism, as well as from specific threats that were mere possibilities in 1996 (and not conceived of at all in 1972). These may include attacks using chemical, biological, radiological and nuclear weapons (CBRN), or suicide terrorism. It is also

important to look more widely than just at terrorism aimed directly at the Olympic Games.

From July 2003 onwards, a series of explosions occurred in Athens aimed at a variety of targets. The majority were claimed by 'Revolutionary Struggle', an extreme left-wing terrorist group that continues to operate today. These attacks sowed doubt concerning the ability of the Greek police to protect the Games successfully. They also enabled Revolutionary Struggle to call a unilateral 'cease-fire' for the duration of the Games, thus enhancing the illusion of their power and influence. Terrorist attacks from whatever source that occur anywhere in the host city at any time prior to the Games generate a negative perception of the safety of the Games themselves. With the crucial role of sponsorship and the need for the organisers of any Olympics to maximise the return on investment, the implications of such attacks are clear.

Targeted disruptions

The G8 summit in Gleneagles, Scotland, during July 2005, provided the biggest test to date for the type of policing required to deal with a high-profile, combined security and potential public disorder threat. The simultaneous suicide bomb attacks in London on July 7th, the day after the 2012 Olympic Games had been awarded to London, shows that security planning must have a national and not just a local focus.

Until recently, public protest during an Olympic Games and its associated events was almost unheard of. The first inkling that this might change came in 2000, as protesters realised the potential of the Salt Lake City Games to raise their media profile. Protestors against animal cruelty used the opportunity of the passage of the Olympic torch to demonstrate against the holding of an 'Olympic Rodeo'.

This trend continued in advance of the Winter Games in Italy during 2006. The passage of the torch was dogged by anti-globalisation protestors (aimed at the main sponsor of the Games, Coca Cola) those who objected to what they saw as the increasing commercialisation of the Games, and local demonstrators who had no issue with the Games but saw it as an opportunity to protest against the advent of a forthcoming high-speed train link.

Serious crime in connection with iconic events

It appears that certain types of criminal develop the perception that, as police attention must be wholly focused on the mega event, there is an unrivalled opportunity for them to engage in a 'criminal spectacular' elsewhere. The opening day of the 1994 Lillehammer Winter Olympics provides an example. On that day, Edvard Munch's famous *Scream* painting was stolen from the Norwegian National Gallery in Oslo.

Other big events have also been used as cover for major thefts of art. St Patrick's Day is a widely-celebrated and significant social event in Boston, Massachusetts. On that day in 1990, several Rembrandts, a Vermeer and other significant works of art were stolen from the Isabella Stewart Gardner Museum. Closer to home but again embodying the same principles of distraction, Millenium Eve night in 1999/2000 saw the theft from the Ashmolean Museum, Oxford, of their only painting by Cezanne. The motivation behind all three of these examples was personal criminal gain.

In terms of identifying evidence on the security threats to the Olympics, there is a lot of evidence on strategies that did not work (or to put it another way, high profile security breaches). However, since the essence of security is to reduce threats, when it is successful it is rarely publicised and even more rarely evaluated. A more in-depth evaluation of the previous security regimes would require access to primary data sources as well as secondary ones, but it would undoubtedly allow a range of difficult questions to be addressed (Box 13). The sorts of security threats that are likely to be in place during 2012 are very difficult to predict, however Chapter 4 uses a futures matrix methodology to identify likely threats and security solutions for London 2012 in an attempt to provide evidence based security planning for the Games.

Questions

How can London deliver on the demands for a secure Games while also respecting the freedoms of participants, organisers and spectators?

How can London take into account the diverse threats to the security of the Games?

What are the key lessons to learn from previous security arrangements (both successful and unsuccessful) in terms of addressing different security threats to the London Games?

Box 13. Questions arising from evidence associated with the Olympics and security



3.1 **Effective transport planning is critical for mega-events**

An event the size of the Olympics needs well-orchestrated machinery to ensure its smooth running. One of the key components of this machinery is the transport system. It is estimated that the London transport networks will have to move 55,000 athletes, officials and media, 500,000 spectators and 120,000 staff and volunteers each day, in addition to the usual traffic. Much of this additional traffic will be centred in London, but transport links to and from the London area will be substantially impacted as well. The transport network will also have to ensure efficient movement of goods and equipment, which can be expected to grow in volume during the Olympics.

In order to accommodate this unusually high demand, major improvements are planned for London's transport infrastructure, in addition to several ongoing works and adaptations. These include, for example, the provision of new buses, new or refurbished tube trains, upgrades and extensions to the Docklands Light Railway, and the completion of the Channel Tunnel Rail Link to St Pancras, which will provide high-speed rail services directly to the Olympic site near Stratford. Although the Olympics has only served to expedite many of these projects, the Olympics transport plan nevertheless includes a few projects, such as the Olympic Javelin, planned specifically for the Games. With over £17 billion being spent on improving London's transport system over the next 5 years, the 2012 Games is set to deliver a lasting transport legacy for Londoners.¹¹¹

The decisions on how to allocate the money are subject to a number of constraints. Transport planners must ensure that the transport strategy for the Games ensures the smooth flow of people and goods through the transport networks at minimum cost to the environment. The hosting of the Olympics will have to be achieved at minimum cost to the taxpayer. Any investment in transport infrastructure must be justified by future use. It would be grossly inefficient to build roads and networks that are never used in the post-Olympics era, or that need large further investment in order to make them useful after the Olympics.

¹¹¹ Quote from Ken Livingstone, mayor of London.

It is therefore essential to understand what infrastructure is required for the travelling public and how travellers can be persuaded to use the most efficient transport options. It is important to be able to predict how traffic on the transport network may vary depending on the changes in basic assumptions about people's travel (for example the proportion of Londoners expected to be on holiday during the Games and thus not making usual commuting journeys), and to understand the impact of failures in crucial parts of the system.

The rest of this chapter will focus on each of these issues. Section 3.2 takes a look at the challenges facing the development of an effective and efficient transport strategy for the Olympics, and discusses several approaches to achieve this. Section 3.3 discusses the importance of ensuring that the Olympics leave a lasting legacy that is positive and examines the challenges to this objective. Section 3.4 deals specifically with the issue of prioritising transport plans to meet cost constraints. Finally, section 3.5 concludes with key guidelines for the development of an effective transport strategy for the Olympics.

3.2 **Rigorous travel demand modelling is key to effective transport strategy**

In order to devise an effective and efficient transport strategy for the Olympic Games, it is necessary to have a reliable and accurate estimate of the demand for various transport services. What is the peak demand expected on the London Underground's Jubilee line during the Olympic Games, and when is this peak likely to occur? What is the average demand expected for a park-and-ride site located at Ebbsfleet? What is the expected demand for coach parking at the venues? These are just a few of the questions that travel demand models must answer.

The following sections present a comprehensive picture of what can be achieved through travel demand modelling for the Games (section 3.2.1), discuss the main challenges in the accurate estimation of travel demand for the Games (section 3.2.2), and present some solutions to overcoming these challenges (section 3.2.3).

3.2.1 **Rigorous travel demand models are comprehensive and behaviourally realistic**

Reliable estimation of travel demand requires the development of accurate and behaviourally realistic models that assess the number of people who will be travelling to the Olympics venues from different parts of the UK and the world by each relevant mode of travel. These models must examine the variation in the demand for transport by time of day and during the two weeks of the Olympic Games, and capture accurately the sensitivities of the public to different transport arrangements. The resulting spatial and temporal estimates of travel demand can contribute toward effective transport planning, for instance through the introduction of additional bus services to handle excess demand on certain corridors, or the introduction of demand management schemes to control or reroute the demand on those corridors.

In order to develop accurate travel demand models for the Games, it is necessary to form a comprehensive picture of travel behaviour during the Games. Specifically, we need answers to the questions listed in Box 14. Answers to these questions can lead to better specified, and therefore, more accurate travel demand models. In other words, if we can understand

the motivations that drive people we can make a better estimate of their travel demand. Clearly this demand must also be a function of the schedule of events for the Games, but total demand will comprise more than the number of people who travel to London to attend specific events, it will also include the people who travel to London just to feel a part of the festivities, even if they don't have tickets to any of the events. Further, some people may travel to London only to attend the events for which they have tickets while others may plan on staying in London longer to enjoy some sight-seeing and tourism.

- What kind of people travel to special events – income level, age, gender, car ownership, household structure (marital status etc.), employment status? Do different types of people have different travel needs, e.g. mobility restrictions?
- Is willingness to pay for travel to special events any different from other purposes – how does sensitivity to travel times, cost, interchange time etc. differ?
- What is the composition of the groups people like to travel in – what proportion prefers to travel with their entire household, what proportion prefers to travel with large groups of extended family members and friends, how many prefer to travel with colleagues, how big is the expected size of the groups?
- When are people likely to travel – the day before the event or the day of the event? How many are likely to head into London the day before the event and stay with friends/family overnight?
- How many people plan to travel only if they can attend some events at the Olympics? How many would travel just to be in the city during the Olympics, and be content to sightsee even if they don't have tickets to the events? How many people would be happy to view the events at a local large-screen facility?
- How long do people intend to stay in and around London? Do they plan to attend only a few days of the Olympics, or do they plan to stay the entire length of time? How many combine a tourism trip with the Olympics?
- How many people travelling to London during the Games are likely to stay in the Greater London Area and how many prefer to stay outside this region?
- What modes of travel will be used to get to the events? How will this be influenced by provision of information? How many visitors are likely to hire a car?

Box 14. Questions to be answered in understanding travel behaviour during special events

Reliable travel demand models can be developed to address more strategic questions based on an understanding of the issues presented in Chapter 1. For instance, models can be developed to estimate the demand for a new mode such as Park and Ride or to estimate the change in mode shares over time in response to policies that curtail private vehicle use in Central London.

Transport strategy for an event of the magnitude of the Olympic Games must also include a 'worst scenario' plan, under the premise that one or more of the assumptions going into

the transport strategy (such as assumptions of background traffic, venue capacity etc.) could be wrong. Behaviourally realistic travel demand models can not only predict such a scenario reliably by accurately capturing people's sensitivities to different transport arrangements, but can also help the transport planner identify solutions to such a scenario, for instance by identifying under-utilised corridors in the transport network.

3.2.2 **Modelling travel demand during 2012 will be a challenge**

The development of comprehensive, accurate and behaviourally realistic travel demand models, difficult enough for regular transport planning, is even more difficult when planning for a mega event of the scale of the Olympics.

One of the key challenges is the fact that events such as the Olympics attract a particular segment of the population, and this is compounded by the fact that there has been very little data collected to help describe this segment of the population. On the other hand, transport planners for special events are assisted by the fact that demand for these events can be controlled to a certain degree by ticket sales, and that travel choices can be influenced to a certain degree by provision of information.

Despite the opportunity to influence mode usage, it is important to develop models that can reliably assess travel demand along different corridors in order to support and justify the costs of transport investment plans such as the building of park and ride lots and supplementary rail lines. Such investment can be supported by a reasonable estimate of the usage of these facilities not only during, but also after the Olympic Games. Moreover, models of travel behaviour can also estimate the effects of information on travel-related choices. How many visitors with tickets for the Games are likely to follow the travel advice provided with their tickets? And, consequently, what is the best strategy for the provision of information? This is clearly a function of how familiar an individual is with the London area transport network, the mode of travel preferred by the individual on a regular basis, the number of people accompanying the individual etc.

Another challenge facing transport planners is the fact that travel demand estimates for the Olympics will depend heavily on the Games schedule, which is not likely to be finalised until some time close to the Games, by which time the transport strategy should already be in place. The transport strategy must therefore be not only robust but also flexible. Data from ticket sales, which is likely to increase as we get closer to the Games, can be used to fine-tune the transport strategy in the months leading up to the Games.

A third challenge is the fact that total demand will vary geographically as well as temporally, with definite surges expected before and after scheduled events. The geographical variation in demand is likely to be driven by several factors, such as distance from the venues, accessibility by different modes of transport, socio-economic characteristics of the visitors, and availability of local large-screen facilities to view the Games etc. These motivations are also likely to be very different for travellers from other countries, who have the added incentive of visiting a new country and are therefore less likely to be deterred by distances. It is important to take all these factors into consideration in order to develop reliable estimates of the temporally and spatially distributed travel demand for the Games.

A comprehensive travel demand model must not neglect other segments of the population that also need to travel during the Games – the officials and volunteers, press, businesses catering to the Games, the athletes and their families – and the background travel of the residents for commuting, education, shopping and all other usual requirements. Suitable and, to the extent possible, accurate assumptions will need to be made for each of these categories of travel. For instance, because the Games will be held in the summer holiday period, organisers are depending on substantial reductions in commuting traffic. Reasonable estimates of these reductions, and sensitivity tests conducted by varying these estimates, are important for developing an effective transport strategy.

Clearly, a transport strategy for the London Olympics must be capable of handling large volumes of traffic that are spatially and temporally concentrated with a wide range of purposes and degrees of urgency. Moreover, in order to be effective, the strategy must incorporate innovative temporary and/or permanent transport and traffic management schemes. The transport strategy would not be complete unless the long-range plan is well supported by a real-time traffic management system that can handle problems such as scheduling, unexpected vehicle failures, and security concerns (the security issue is discussed in Chapter 4).

3.2.3 **An effective model has a strong basis in data and an understanding of behaviour**

The first step in developing a transport strategy that can meet all the above challenges is the development of reliable and behaviourally realistic travel demand models, and at the heart of these models is data (see Box 15 for details of data collection methods). Although aggregate measures – such as population, employment, and venue capacity – are sufficient to develop rough estimates of travel demand, it is possible to develop more accurate estimates that are also sensitive to changes in the social, economic and transport environments. This can be achieved through surveys designed to enhance our understanding of travel behaviour. The following are some ideas for surveys to increase the evidence base in transport planning for mega-events.

- A) Gather revealed preference (RP) data from past events – typical aggregate mode shares at previous Olympics (specifically the difference between a regular weekday mode share and Olympics mode shares); revealed preference data identifying socio-economics, willingness-to-pay (compared to other purposes), and other answers to questions from Box 14. Potential sources of such data include recent events such as the Manchester Commonwealth Games or even a survey based on the FA Cup Final. The 2007 Cup Final presents a particular opportunity because Wembley has been out of use for some years and travellers were unaware of what to expect at the new stadium, as they will be when coming to the Olympics.
- B) Conduct stated preference (SP) mode choice surveys specifically for London 2012 – consider existing modes as well as proposed modes such as park and ride. SP games can effectively capture sensitivities to varying travel times and costs, wait times, interchanges, reliability etc. Such SP surveys may also indirectly serve as a means of influencing travel choices for the Olympics.

High quality data collection is critical for the development of robust transport models. However, data collection often involves substantial cost and time. It is therefore of the utmost importance that the right data is collected and it is of the highest possible quality.

A wide range of data collection methodologies and survey instruments have been used in the past to collect data for transport modelling applications. The data collection methods that are typically used in the UK include:

- On-street surveys (including roadside interviews)
- Telephone surveys
- Household surveys
- Internet surveys.

On-street surveys, either in the form of roadside interviews or interception of pedestrians on pavements or in places such as shopping centres, can provide a large quantity of data at relatively low cost. However, any roadside interview will almost invariably require police cooperation to assist in stopping traffic and ensuring unacceptable queues do not develop. There are costs associated with this, and furthermore sites must be found for the interviews where there are sufficient lanes and road space consistent with the traffic flows to ensure minimum disruption to traffic. More advanced transport models require not just trip information but detailed tour and activity information in addition to demographic terms. In particular, household income has been found to have a substantial influence on, for example, road pricing schemes. Achieving this level of information through on-street methods is often impractical.

Other forms of interviews such as telephone and household interviews have been widely used, either alone or in combination. These methods, while more time-consuming and expensive, can provide a much richer dataset which allows the development of more robust and behaviourally rich models than would otherwise be possible. Careful design of the survey instrument and briefing of respondents can produce the high quality data essential to the modelling effort.

In the last few years, the internet has increasingly been used to collect survey information as it can be very cost effective (costing perhaps 20% or less of the cost of traditional survey techniques) and can provide data in very short timescales. A number of companies in the UK provide online panels, often extending to many thousands of respondents, that can be readily contacted for all kinds of transportation research studies. There are however issues with regard to sampling bias associated with internet surveys; although 57% of households in Great Britain now have internet access, this is biased towards younger, more highly educated and higher income groups. As such, it is typical to supplement any internet survey with a telephone recruitment stage to ensure a representative sample of the target population is obtained.

Forecasting demand often requires an understanding not only of current demand drivers, but also the response in future scenarios where step changes in supply occur. Classic examples are the provision of all-new infrastructure such as toll roads, light rail or bus links where previously there was no such connection. In such instances stated preference (SP) methods have been widely used in the transport sector. These are hypothetical scenarios where respondents are presented with possible means of making a journey, each of which has different combinations of cost, time and other relevant attributes. Such methods have been shown, when developed with sufficient care, to produce robust forecasts of future demand. However, being based on hypothetical scenarios these methods should always be supported by existing behavioural data wherever possible (often called revealed preferences (RP)). The methods to incorporate both RP and SP data are now well developed, and widely used.

Box 15. Data collection for special events

- C) Add on a few questions to one of the UK panel surveys (and perhaps other European or US panel surveys as well). These questions could be targeted at capturing the responses of a larger population to broad questions such as: would they travel to London to watch Olympic events or would they be happy with a local large screen facility? Would they travel to London to be part of the Olympics festivities even if they didn't have tickets to any of the events? Answers to these questions would help corroborate planning assumptions.
- D) Conduct surveys of tourists to London and the UK to understand their travel behaviour and patterns. This can give us a better understanding of how current visitors to London make travel decisions, what information they use, and other factors that influence their decision-making. Such tourist surveys will also have long-term transport planning benefits.
- E) As we get closer to the Games, ticket sales data can be used to refine the travel demand models and make suitable modifications to the transport strategy. It would therefore be useful to gather some socio-economic and other data during ticket sales.
- F) Conduct surveys during the Games to help improve transport services in real-time. Although a challenging task, this will at the very least serve to improve real-time transport strategy.

As indicated by the above suggestions, survey data – be it RP or SP – help us understand the motivations underlying travel behaviour. For example, the results of a survey conducted by Nerotti et al.¹¹² during the 1996 Atlanta Games indicated that 51.3% of the people attending the Games were sports fans, while tourists formed the second largest category (16.6%). Data such as this help us answer the questions in Box 14 and thus develop a clear conceptualisation of the travel-related choices made during special events. The next logical step then is to translate this conceptualisation into a model structure.

Take, for instance, mode shares, an important component that characterises travel demand. A mode choice model that captures spectators' and tourists' choice of mode as a function of travel time and cost (among other factors) must be developed to estimate mode shares. Figure 3 presents a nested logit mode choice model that captures the correlations between the alternative modes. The model suggests, for example, that the different coach modes are more interchangeable than coach and rail, and therefore belong together in a nest. In other words, individuals who travel by any one of the coach modes are likely to possess a 'stickiness' for the mode and as a result they would be likelier to switch to one of the other coach modes than to rail. Similarly, the model also suggests higher cross elasticities between the public transport modes. It is possible to take this behavioural perspective a step nearer towards reality by considering a cross-nested logit model, which incorporates the fact that the park and ride mode can belong to both the 'Public Transport' and the 'Private Vehicle' nests (as indicated by the dotted lines in Figure 3).

¹¹² Nerotti, Bosetti and Teed (2001) 'Motivation to Attend the 1996 Summer Olympic Games', *Journal of Travel Research*, Vol. 39, pg. 327.

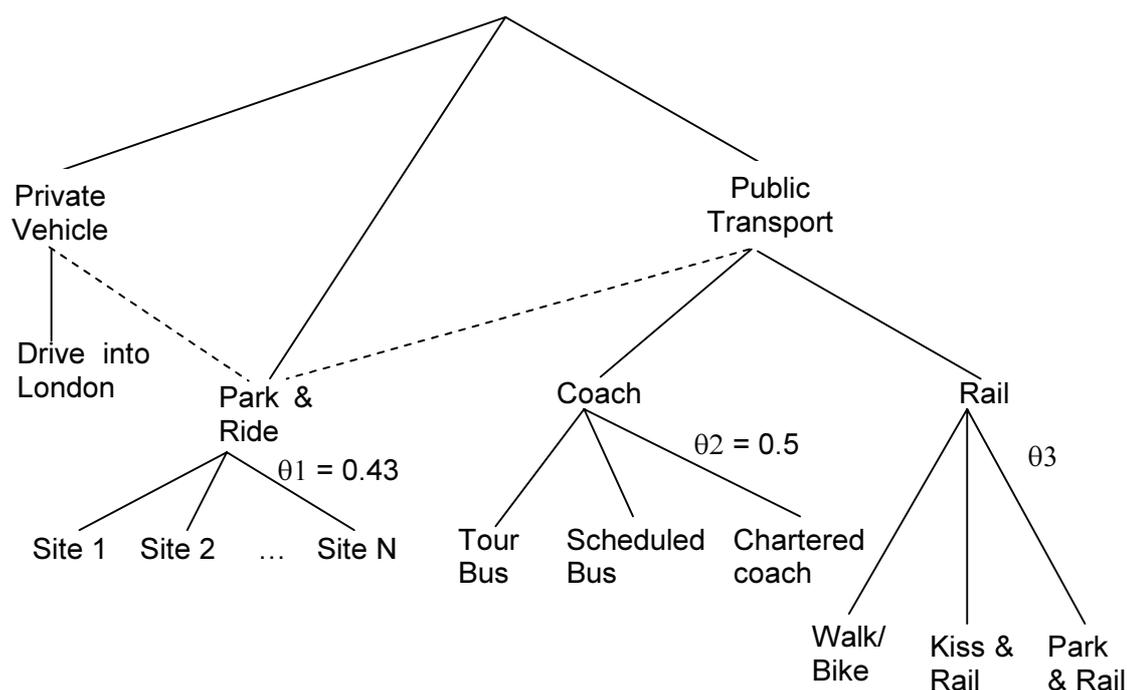


Figure 3. Nested Logit mode choice model

Even apart from exploiting recent advances in modelling as suggested above, behavioural realism can be incorporated into the mode choice models for the Olympics through the intelligent use of data – both existing and collected from surveys as discussed earlier in this section. For instance, car ownership data can be used to refine the mode choice model through accounting for the availability of car-based modes. Similarly, a better understanding of the socio-economics of the Olympics spectators will enable us to develop more accurate mode choice models with travel time and cost sensitivities that are more representative of the traveller population, by accurately accounting for the differences in values of time across socioeconomic groups.

3.3 Transport/land use legacy impacts of the Olympics can also be modelled

This section will briefly discuss London's legacy planning and how focused research and analysis can help ensure that the hosting of a mega event such as the Olympics can contribute to the economic and community development of the city for the years to come.

3.3.1 Regeneration of East London

Central to the Olympic Delivery Authority's vision is the regeneration of East London. The Lower Lea Valley, covering an area of approximately 1,500 acres, is the largest remaining regeneration opportunity in inner London. It includes parts of the London Boroughs of Hackney, Tower Hamlets, Newham and Waltham Forest. Although the area is situated just three miles from Central London, it is largely underdeveloped and is characterised by derelict industrial land and poor housing conditions. It also houses one of the most deprived communities in the UK, with some of the worst levels of public health.

Unemployment is as high as 35%. Thus, ‘regeneration of the area is of crucial importance in tackling poverty, unemployment, lack of basic skills and poor health’.¹¹³

Lessons on legacy planning can be drawn from other Olympic cities, such as Atlanta and Sydney. Both Atlanta and Sydney staged the Games in relatively underdeveloped areas – a small area of downtown Atlanta and the western suburbs of Sydney. However, the two cities took very different approaches with regards to legacy planning. Atlanta built permanent facilities only if there was an existing demand for them, and planned those facilities from the beginning based on how they would be used after the Games were over. On the other hand, Sydney focused resources on putting on the best Olympics possible and was pressured by sporting organizations to build permanent facilities, so it built many permanent venues that were only needed during the Games. The result was that most sporting venues in Atlanta were fully utilized and enjoyed by citizens afterwards (with some exceptions), whereas in Sydney many sports venues were left empty for long periods and are still being converted to facilities which will hopefully be usable by the local community.¹¹⁴ Contrast this with the fact that Sydney’s transport plan for the Olympics was more successful than Atlanta. Clearly, an effective transport strategy for the Olympics does not automatically fulfil legacy objectives.

Many believe that the London Olympic plans will be a success, since regeneration of the Lower Lea Valley would have taken place anyway, and that the Games simply provide a firm deadline that serves to accelerate the project timelines. Sustained post-Games demand is often seen as a given. However, acceleration of development plans may also force government authorities to make investment decisions on short notice without careful research and analysis, which could result in unwanted legacies. This is a pitfall that government authorities must avoid.

In order to develop an understanding of the impacts of regeneration and transport improvements, the following discussion will examine two key legacy impacts - Housing market and the Economy.

3.3.2 Housing market

It is expected that the Olympics will have a positive impact on house prices in East London, although the extent of the impact has varied greatly for past Games (see Figure 4).

For London, it has been one and a half years since the bid, but the impact on the housing market in East London has yet to be seen. According to Land Registry Office data, average house prices in four out of the five Olympic boroughs have grown at a lower rate than Greater London as a whole since the bid.¹¹⁵

¹¹³ As recognised by the London Development Agency (LDA, 2006)

¹¹⁴ Dann, B. (2004). “Legacies of the Games: Long-term Impacts of the Olympic Games on the Host Cities of Atlanta and Sydney”, Duke University.

¹¹⁵ Kornblatt, T. (2006). “Setting the Bar: Preparing for London’s Olympic Legacy”, IPPR Centre for Cities, Discussion paper No. 8, London: Institute of Public Policy Research.

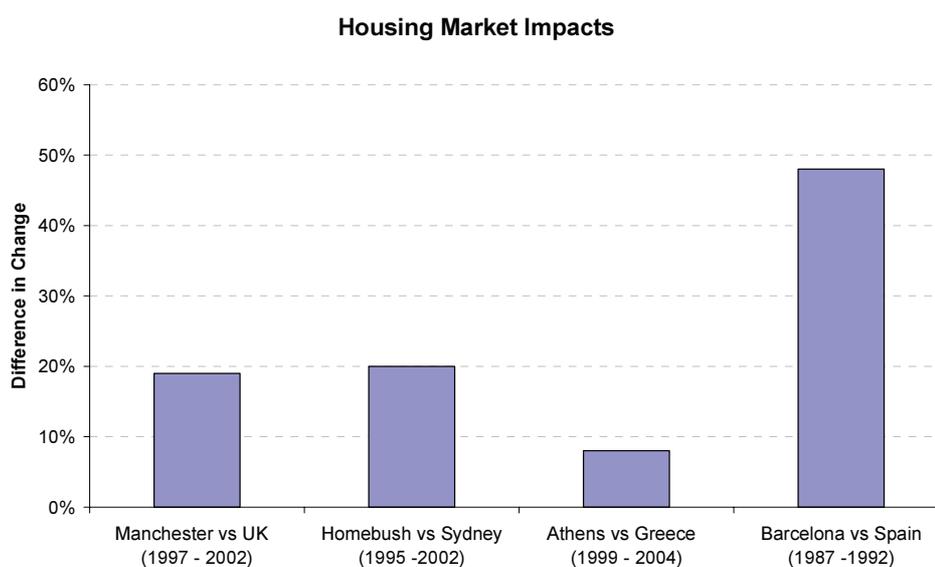


Figure 4. Housing Market Impacts

Source: Halifax (Reproduced from: UBS, 2006)

The Olympic regeneration promises 4,500 ‘affordable housing’ units and 4,500 other houses, with the designation of the Olympic Village as housing stock.¹¹⁶ More housing in East London could serve to tame the overheated housing market in central London. But is the scale of regeneration any match to the actual scale of the problem? Moreover, if the supply of housing is not enough to meet demand caused by the regeneration of the local economy, it could cause housing prices in the area to soar. The effect could be that local residents, most of whom are relatively poor, will then be forced to move to other deprived areas to find affordable housing. To prevent this negative outcome, ensuring the affordability of housing is key. Thus, it is crucial to have a quantitative understanding of the real estate demand and supply interactions, as well as the residential location choice behaviour of the households, taking into account the willingness to pay of the rich and the ability to pay of the poor.

3.3.3 Economy

A huge amount of funding is often poured into ambitious transportation infrastructure projects such as the Docklands Light Railway extensions or the much higher budget Channel Tunnel Rail Link. It is hoped that this infrastructure will serve as an engine for economic development. This hope is based on the belief that transportation infrastructure creates and induces inward investments¹¹⁷.

¹¹⁶ UBS (2006).

¹¹⁷ However, it must be remembered that, in the words of the Eddington Study (Eddington, 2006), ‘Transport cannot of itself create growth: it is an enabler that can improve productivity when other conditions are right. Economic growth itself causes rising transport demands which, if left unchecked, can put the transport network under strain, damaging productivity and competitiveness.’

In Barcelona, for example, tourism rose from 2% of the city's GDP pre-Games to 12.5% of the GDP post-Games, and continued to grow to 15% by 2005.¹¹⁸ The Olympics put Barcelona 'on the map' internationally. But London is already on the map. London, as a top-tier world city, is unlikely to reap as much benefit as Barcelona did from the Olympic Games. Several recent impact studies have suggested only modest generative effects on employment.¹¹⁹

Instead, regeneration of the East End is likely to bring about redistributive effects. More businesses (and households) will be attracted to the East End. The resulting effect may be an alleviation of the congestion problem in central London. However, if the capacity of the transport system in the East End cannot cope with the upsurge in demand, then the result will be an increase in congestion in the East End. Thus, coordinated planning of transport provision and floor-space provision is crucial.

Another important question is whether economic benefits will also accrue to the rest of Britain. As London is already the primary city in Britain, the gaps between London and the second or third-tier cities are likely to grow wider. The full implications of such effects will be very difficult to measure and will require further analysis.

3.3.4 Further Studies

Various impact assessments on the topic, such as those by the Department of Culture, Media and Sport¹²⁰ and Blake,¹²¹ have used macro approaches to analyse the legacy impacts of the Games. These studies should be complemented by modelling approaches which focus on how individuals and businesses respond to improvements in the transport systems, particularly in terms of making travel decisions or locational (such as residential or work location) decisions, in order to fully understand the long-term effectiveness of the Olympics transport strategy. Of equal importance is the need for further analysis to examine how the benefits of the transport plan are distributed spatially so as to develop appropriate spatial strategies for the local community and the UK as a whole. This evidence need calls for an integrated modelling approach to the analysis of transport and land use.

¹¹⁸ UBS (2006).

¹¹⁹ Blake, A. (2005). "The Economic Impact of the London 2012 Olympics", Christel DeHaan Tourism and Travel Research Institute, Nottingham University Business School.; UBS Investment Research (2006) "Winning by Taking Part: East London's Economy and the Olympics", London: UBS Limited.

¹²⁰ DCMS and PricewaterhouseCoopers (2005) "Olympic Games Impact Study", London: PricewaterhouseCoopers.

¹²¹ Blake (2005).

3.4 **A behavioural approach to cost-benefit analysis of infrastructure investments**

3.4.1 **The need for independent quantitative assessment**

The Olympics brings with it the opportunity to invest significantly in new or improved infrastructure, be it transport, new facilities or ‘softer’ changes to the urban environment and social regeneration. Therefore, the ODA will face a series of competing priorities for their investment, and the budgetary constraints are likely to be such that judgements will be required as to which should and which should not be funded.

A key consideration in any cost-benefit analysis of the options will be the necessity of delivering the Olympic events; however, some of the investments will be slightly more peripheral to the core games infrastructure. In other cases, the investments will be necessary, but extra ‘value added’ options may be possible, where for a small amount of additional investment the legacy of the infrastructure can be improved.

In order to compare competing options, it is necessary to develop a framework that creates a ‘level playing field’ so that the benefits and costs can be quantified in a consistent manner across bids. While measuring the costs will bring challenges of its own, the issue that we will focus on here is the more complex issue of how best to measure the benefits that a scheme may accrue. We concentrate mainly on the value that those within society place on the investment, which may act over and above any economic value that the investment may return, i.e. what is it ‘worth’ to the community?

3.4.2 **The challenge – how to measure benefits?**

The benefits to society are a difficult, but important, component to measure in any investment that claims to have a legacy value over and above its purely economic return. This is an area where subjective valuations and poorly substantiated claims are found more often than robust estimates of the value elicited from the public.

There are two approaches set out in the Treasury Green Book for valuing non-market impacts: contingent valuation and choice modelling. Contingent valuation studies elicit valuations via direct questions such as ‘What is the maximum amount you would be prepared to pay every year to receive good x?’ or ‘Which of the amounts listed below best describes your maximum willingness to pay every year to receive good x?’ However, these forms of questions are quite transparent and are easy for the respondent to manipulate if they have strong feelings regarding the item in question, or the concept of paying to receive it. Choice experiments are better suited to eliciting the value that individuals place on situations that are more complex (e.g. have multiple elements to value), or services for which asking for payment may be particularly controversial.

3.4.3 **Use of discrete choice experiments**

Discrete choice experiments pose the respondent with a choice, for example: choose A, choose B, or choose nothing. By building up the alternatives that the respondent is asked to consider within their choice, it is possible to take the respondent a step away from instantly dismissing a single proposition put to them. Figure 5 illustrates the form of choice that a respondent could be asked to consider.

It is proposed to build a cycling track (velodrome) in East London.

The core funding for the Olympic Games is already provided, but additional investment could allow the facility to serve the community for years to come.

Please consider the following options. We would like to know which of the following, if any, you would be prepared to pay towards through increases in your council tax.

No additional investment	Option A	Option B
Velodrome has expected life of 5 years	Velodrome has expected life of 15 years	Velodrome has expected life of 10 years
No refreshment facilities included in the complex	Café and restaurant included in the complex	No refreshment facilities included in the complex
BMX track relocated following Olympics	BMX track relocated following Olympics	BMX track retained on-site
No guarantee over future events	No guarantee over future events	Hosting of national cycling events guaranteed for 3 years
No increase in Council Tax	£5 per year increase in Council Tax	£10 per year increase in Council Tax

Figure 5. Sample discrete choice experiment

This is provided as an example, and clearly the context of the choice (i.e. the facility under consideration), the attributes within the choice (i.e. the factors used to describe the options), and the levels of these attributes (including the amount of tax to secure the facility) could be varied according to the needs of the valuation.

In discrete choice experiments, we are asking respondents to make trade-offs. Here we ask them to consider combinations of five attributes, of which money is one. The key to these choice exercises is the ability to both capture the value placed by the respondent on each of the attributes considered, and the combined value of these. In this example, given a series of responses to varying questions of this type from each of a number of respondents, we could measure the willingness to pay for the BMX track to be retained on site.

Although the measure we are collecting is willingness to pay, this does not imply that we would necessarily advocate that respondents should be asked to pay this amount. What it does give us is the value that they feel they would gain if such facilities were available. The measurement of this value is at the heart of the legacy debate.

3.4.4 Modelling the preferences of different groups in society

The discussion so far has looked at how much society as a whole values different legacy features, measured by taking an average value across all respondents. With the modelling of this data we can go a number of steps further to providing an insight into how this value differs between different groups in society.

The first refinement we can make is to investigate whether identifiable groups have different values, e.g. does the willingness to pay for improvements increase with disposable income? Do those of particular ages or with particular sporting interests or living in particular areas place higher value on certain types of facilities? These are the types of hypotheses we can test in the modelling, running systematic tests to identify where differences appear to exist and then to quantify the scale of the difference.

The second refinement we can make, once we have accounted for all of the differences we can explain through observed background variables, is to introduce distributions of the

values within the groups. For example, we may find that those on lower incomes are less willing to pay for certain improvements, but this group will not necessarily be homogeneous in their preferences, and we can take account of this by estimating not only the average value for this group but also the standard deviation around the mean.

These refinements will allow a far more insightful analysis of who will benefit from certain investments, an issue of particular interest where legacy features of the investments are being promoted for their benefits in addressing social inequalities.

3.4.5 **Calculating the 'value' of investments**

The approach outlined above provides a technique which can be used to estimate the willingness to pay for certain attributes of an investment. However, this can be taken a step further and we can obtain the consumer surplus from a given form of investment. Consumer surplus measures the net benefit accruing to consumers for a product which is purchased in a market; it is equal to total benefit minus the price. Of course, for many of the investments being considered there is no market in which a decision to buy the availability of the facility can be made, so in our choice experiments we create a hypothetical market in which households are offered choices between situations with and without the facilities, with changes in tax to represent payments they might make. By analysing their responses to these hypothetical choices, a model can be constructed of 'demand' for the availability of the facilities at 'prices' paid in tax.

Given a model of demand, in economic textbooks a demand curve, measures of benefit can be derived: the consumer surplus or 'area under the curve'. This benefit can be measured in monetary terms. The choice models that we would typically develop would contain variables that differ between households and therefore the demand curves for different households would vary. The consumer surplus for each household can be calculated from the choice models by applying the demand curve relevant to that household.

The consumer surplus that can be calculated is not an absolute measure, but calculations can be made for the situation with and without the facility in question. The difference between the two measures, scaled by the cost coefficient, represents the benefit derived from the facility. Once consumer surplus measures have been calculated for each household, average values for households of various types can be worked out. This provides the policy maker with a powerful quantification of who in society obtains value from a certain proposal, and how much value they obtain.

3.5 **Summary**

In summary, transport planning for the Olympics will be a challenging task. The development of an effective transport strategy for the Olympics is dependent on the development of rigorous and reliable travel demand models that are behaviourally realistic and therefore accurate in their response to policies. Further it is important to assess the sensitivity of the travel demand estimates to the various assumptions made, such as the assumptions on background traffic during the Olympics. Accurate estimates of travel demand are not only key to effective transport planning but also contribute to the accurate assessment of the environmental effects of the Olympic transport strategy.

Transport planning for the Paralympic Games, although not discussed in this chapter, needs to be approached with the same degree of rigour and comprehensiveness. The objectives will be slightly different as the needs of the people attending these events are likely to be different on average. However, in order to produce reliable estimates, the basic approach to estimating this demand and the special needs associated with it must continue to be located in behavioural realism.

It is important not only to develop a transport strategy that is effective during the Olympic and Paralympic Games but to also keep in mind the long-term usage and legacy benefits of the transport investments that form part of the strategy. For instance, improvements to address potential failures (such as vehicle or signal failures) in the London Underground will not only contribute to the Olympic transport strategy but also ease transport conditions for users of the Underground. In order to evaluate the legacy benefits of transport investments, it is necessary to undertake integrated modelling of transport and land use.

Transport investment decisions must also be achieved with minimal burden to the tax payer. Therefore, a comprehensive cost-benefit analysis of the various alternatives must be undertaken. Discrete choice experiments can contribute to the effective assessment of costs and benefits as perceived by the various stakeholders, including the public.

Finally, it is important to keep in mind that transport systems are not isolated. In fact, they are closely inter-linked with security, technology, media, ticketing, accommodation, environment etc. and should be treated as such. We conclude this chapter with the key lessons on transport planning drawn from past Games.

Key lessons to learn

- Plan with an eye to legacy.
- Public communication is important.
- Environment impacts must not be neglected.
- Cluster venues of major events near the regeneration area.
- Pre-test the Olympic sport and transport systems with other big events before the Games.
- Olympic events should be made 100% accessible by free public transport.
- A multimodal centralized transport organisation is needed (which we already have in the form of the ODA's Transport division).
- Plan for client-oriented sub-systems (separate fleets for athletes, media, Olympic Family, sponsors, spectators etc).
 - Such a plan could include, for instance, an Olympic priority lane network.
- Transport strategy must include traffic demand management schemes.
 - For instance, plan venues with live large-screen facilities to spread the load.

- Watch out for worrisome transport failures such as:
 - accident or major breakdown in rail network. Possible solutions include the elimination of freight traffic during the Games, and the maintenance of a reserve fleet of buses for contingency.
 - bus mismanagement, confusion and false routings due to weakly managed bus depots, difficulty pairing drivers and buses, driver walkouts due to discontent, lack of knowledge of road system, Olympic routes etc.
 - traffic congestion around venues and major arterials.



“What is ... certain is that the Games will focus the entire world’s attention on London and the UK. More countries will participate at the London games in 2012 than there are members of the UN.”¹²²

Tony Blair, Former Prime
Minister of the UK

4.1 **The security environment in 2012 is unclear**

Being at the centre of the world’s attention as the host nation for the 2012 Olympic Games carries with it darker implications for London and the UK. In terms of security, there are immediate implications that go far beyond any future increased threat from terrorism in the UK and against UK interests world-wide during the period of the Games themselves. Along with China, the UK is one of only two countries in the world that have been chosen to host forthcoming Olympic Games. After the Beijing Games, the global perception of London and the UK will ratchet up further as the UK becomes the host nation for the *next* Olympics. Throughout this period, groups and individuals anxious to seek publicity and recognition for their myriad causes will have a window of opportunity to target London and the UK, knowing full well that they are guaranteed the level of global media coverage accorded to the designated host city and host nation.

Olympic sites and venues appear at first sight to be the most obvious targets for disruption and attack. However, the potential threat from terrorism and politically motivated crime must be seen in a wider context than the Games themselves. In terms of geography, the threat is likely to be not only to London but also to the UK nationally and to UK interests globally. In terms of time, threats already exist today and they are likely to become increasingly tangible between now and the start of the Games. Nor can it be assumed that the current range of threats will not broaden or intensify. As the security environment in 2012 is unclear, security requirements for the 2012 Games must be developed in the face of uncertainty.

¹²² ‘The Greenest Games Ever,’ Tony Blair, *The Guardian*, 23 January 2007, p.26

While it is not possible to predict the security threats that may impact on the Games in five years time, it is possible to foresee the potential range of their scope and diversity. The meta analysis in Chapter 2 highlights a number of instances in the past where large-scale sporting events, including the Olympic Games, have been exploited, targeted, disrupted or attacked to further specific causes, grievances or criminal enterprises. Based on this evidence, there is a clear need for operational and contingency planning to identify and counter a spectrum of threats to the 2012 Olympic Games, to London and to the UK. How is it possible to develop systematic and meaningful planning assumptions today that are relevant and appropriate to an event and time period that lies five years in the future?

4.2 An approach for developing potential future security environments

Trying to *predict* the future security environment five years in advance is a futile exercise. However, it is possible to try to *foresee* in a structured and systematic way a range of different potential security environments that could potentially exist in 2012. The purpose of doing this is to help understand the different implications these have for existing and future security capabilities.

RAND Europe has developed a model that separates the characteristics of any given future security environment (FSE) into three dimensions which are flexible and can be altered. The model does not give any specific weight to a particular future scenario, rather, it treats all futures as equally valid. The three dimensions have been chosen on the basis that it is reasonable to expect that threats to UK security will comprise an unpredictable combination of:

- **Adversary hostile intent:** This dimension focuses on the potential intent of any given terrorist or other actor that engages in security-threatening activities to further its objectives. These activities might range from the use of demonstrations, through sabotage, public disorder and mass casualty attacks. This dimension conveys the intent of a potential adversary through the scale of its ambitions, and by demonstrating the kinds of activities it could conduct.
- **Adversary operational capability:** This dimension focuses on the potential capabilities of the terrorist or other actor to utilise a range of violent and non-violent activities to further its objectives. The technical capabilities will vary from group to group and from individual to individual. While groups may intend to conduct significant activities, they may be constrained (or enhanced) by their level of technical competence. This dimension conveys the range of activities that may be undertaken.
- **Potential domestic/international influences on UK security:** This dimension focuses on the extent to which the overall UK and global situation in 2012 will act as a motivating force for terrorists or other actors. The goal is not to predict specific issues that will motivate future attackers. Rather, this dimension conveys the overall severity of the threat environment and the potential scale and tempo of threats it is likely to inspire. The baseline environment is taken as 2007. A worsening environment from 2007 is likely to mean a greater number of causes

motivating potential attackers. An improving environment will not eliminate all threats, but will likely dampen their incidence and the order of magnitude.

Having established three defining dimensions, it is possible to combine them in order to imagine a number of future security environments. Each potential future security environment will be determined by the relationship between each of the three dimensions. We have chosen to represent this visually in a three-dimensional cube (Figure 6). If the near lower left-hand corner is assumed to be the origin of the cube, then that point will represent where each of our three dimensions are the most benign. As each dimensional axis moves right, up or back (respectively), the dimensions are assumed to become more intense, so that the greatest threat security-wise is in the upper back-right of the cube.

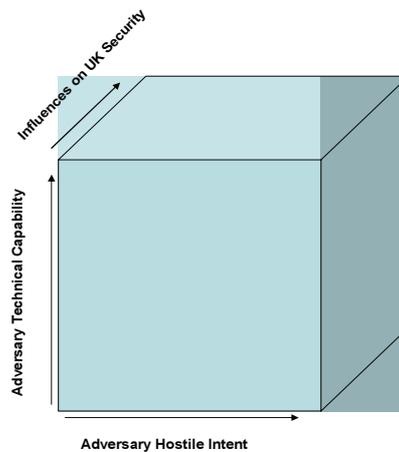


Figure 6. Representation of the three strands of security threat

To understand in more detail the progression along the each dimension from a more benign to a more severe position, three broad divisions have been drawn along each dimension (Figure 7).

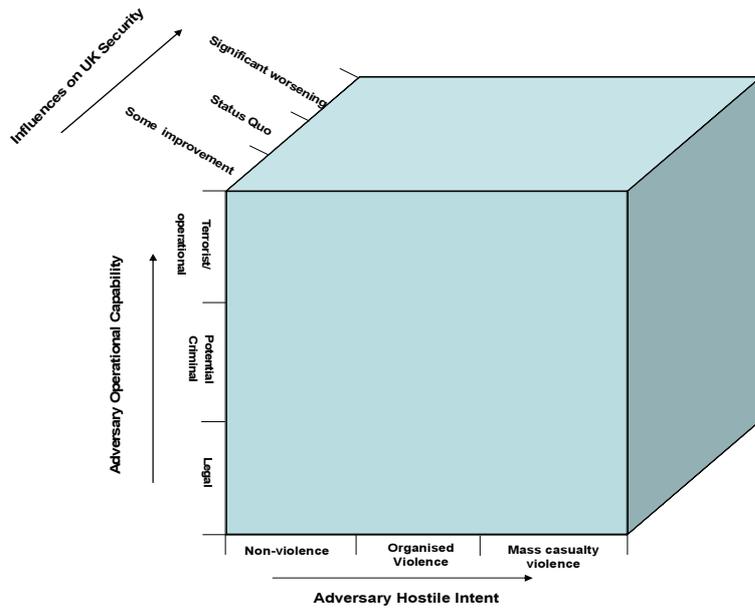


Figure 7. Dividing the security threat by risk

Having created a three-dimensional space that is able to illustrate a range of possible future threats, it is possible to segment that space into sub-cubes. By looking at how far along the dimensions each sub-cube is placed, we can characterise more precisely the security environment given this particular combination of adversary intent, capability and global situation. This produces 27 distinct sub-cubes, each representing a potential future security environment (Figure 8).

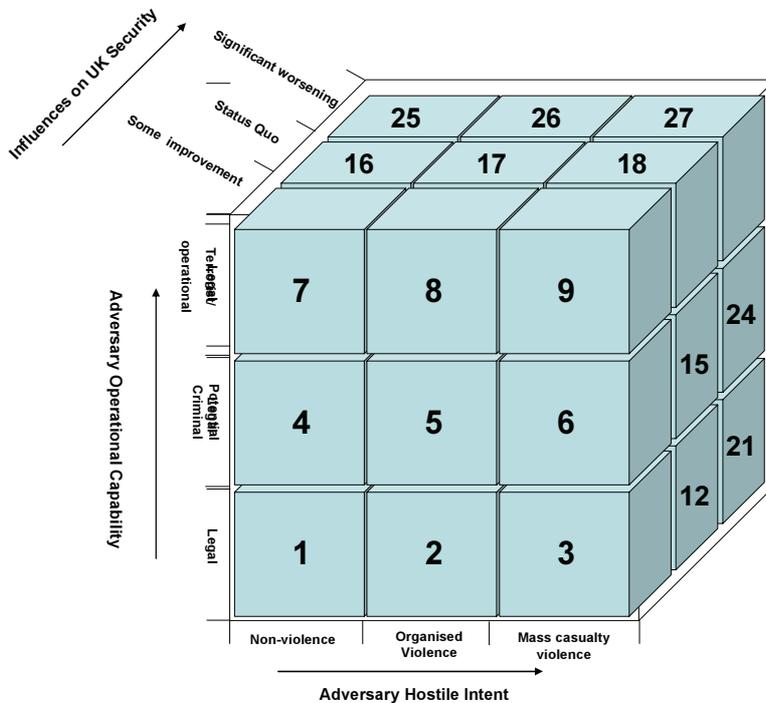


Figure 8. Dividing the future security environments

It is thus possible to visualise future threats to UK security as falling somewhere within a three-dimensional range of possibilities, from the most benign to the most insecure. The model helps to visualise how changing conditions will result in a changing position within the cube. As we near 2012, it will be increasingly possible to understand which future environments are more likely and which are less likely. This will bestow a degree of structure within which contingency planning can be carried out and those planning assumptions exercised.

The model treats each potential future security environment as equally valid. However, six of the sub-cubes produce an improbable combination of conditions. These are sub cubes 2, 3, 11, 12, 20 and 21, because organised violence or mass-casualty violence cannot be carried out legally. These cubes will be excluded from analysis.

4.3 Defining potential security environments

To illustrate how a range of scenarios can be constructed using the cube model, we have picked six sub-cubes that represent highly contrasting future environments. From this we can derive specific scenarios and understand their capability implications. The purpose of doing this is to display the range of possible threats that could exist, *not* to predict specific threats. Section 4.4 will examine the implications this range of scenarios has on the security apparatus that is required to meet these challenges. Not all of these illustrative scenarios relate directly to the Olympic Games, reflecting the possibility that, while a direct assault on the Games is a possibility, security threats might arise with nothing more than tangential connections to the Olympics. Moreover, although many of these scenarios are London-centric, it must also be recognised that incidents may occur elsewhere in the UK as Games events are taking place in a number of locations – such incidents may be displacement attacks (i.e. not undertaken in London due to high levels of security there).¹²³ The following scenarios have been developed for illustrative purposes, and to facilitate the capability analysis in section 4.4.

Scenario 1: this is the most benign future security environment, in which groups challenging security around 2012 to further their objectives will do so using ostensibly legal, non-violent means in a global environment that represents some improvement from the level of instability in 2007. This corresponds to cube 1 (Figure 9).

¹²³ For example, the suicide bomb attacks that took place in London on July 7th 2005 occurred during the G8 summit that was in progress at Gleneagles in Scotland. The timing may have been coincidental but it illustrates the concept.

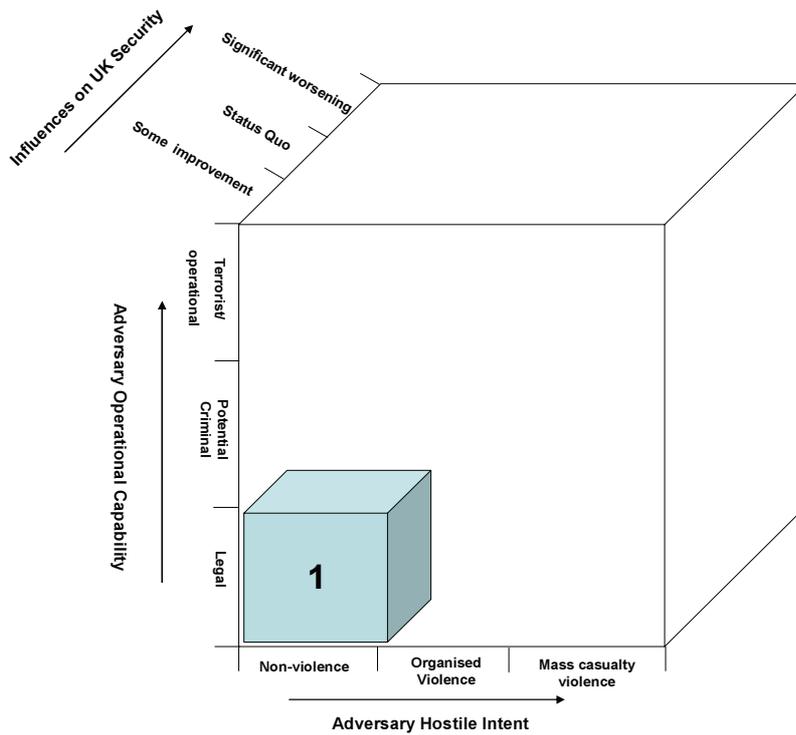


Figure 9. Future security scenario 1

Our illustrative scenario is of a single-issue protest group using the opportunity of the 2012 Olympics to highlight their cause. The group campaigns on a specific environmental issue, and stages a day of protests and peaceful blockades at numerous relevant locations such as petrol stations and major road intersections. The issue has lost some traction amongst the wider population. The core protesters compensate for their lack of mass human resources by operating on a swarming basis, dividing into a dozen different groups, each blocking a single site for a relatively short period of time during rush hour, before shifting location within central London. They coordinate movements using the latest mobile phone navigation technology, moving frequently enough to avoid all being swept up in one go.¹²⁴ This presents a public order challenge, although within a manageable scale.

Scenario 2: this is the future security environment that most closely resembles today. Some groups exist that seek to use terrorism to further their cause, while others possess the capability to cause public disorder. All of this takes place in an unstable global environment in which numerous issues exist that can inflame opinion and motivate attacks. It is represented by cube 14 (Figure 10).

¹²⁴ Historical precedents for this technique were the series of anarchic but pre-planned events that protestors staged during the ‘J18’ and ‘N30’ demonstrations of 1999 in London and again in London, the May Day protests over several years from the late 1990s onward.

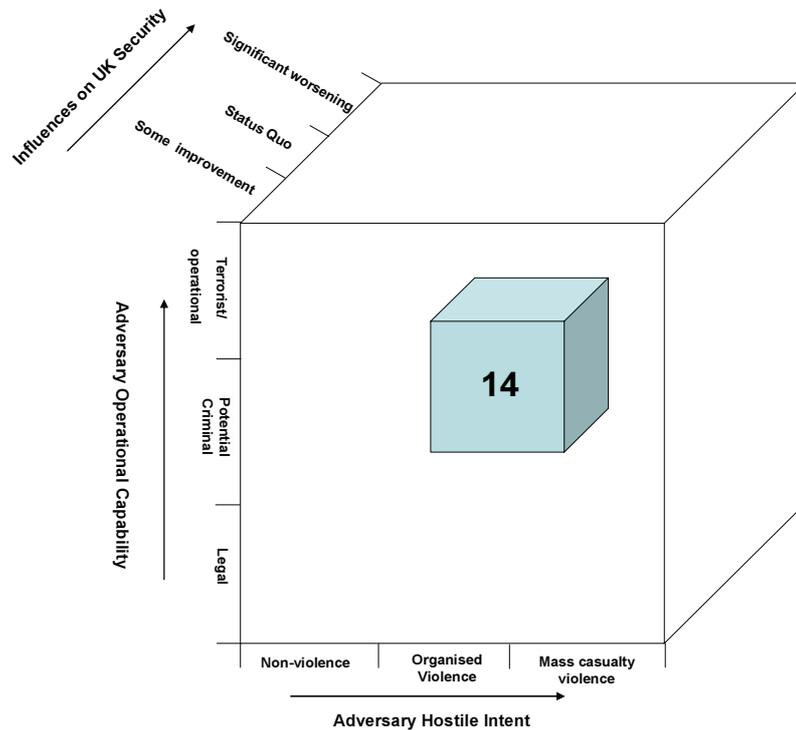


Figure 10. Future security scenario 2

Our illustrative scenario involves a radical element within a UK diaspora community that is planning to launch targeted violent strikes against international targets in London, hoping that the added global attention of the Olympics will serve to advance their cause.¹²⁵ They are motivated to undertake these attacks due to a worsening situation many miles away from the UK, as foreign armed forces clamp down on a nascent state arising out of the consequence of instability in the Middle East. Planned attacks include the kidnap or assassination of a foreign VIP, and a bomb attack against a foreign embassy. The attackers are at the preparatory stage, having formed the intent for an attack and assembled enough personnel to mount it. They are now located in a safe house and are well advanced in acquiring the necessary materials.

Scenario 3: this is the most unstable future security environment, in which multiple groups exist possessing the intent and the appropriate operational capabilities to mount mass-casualty attacks. The global environment has worsened to the degree that multiple causes exist to aggrieve and motivate attackers, increasing both the potential severity of attacks, and the potential frequency of their occurrence. It is represented in cube 27 (Figure 11).

¹²⁵ The hostage crisis at the Olympics in Munich in 1972 serves as a broad historical precedent.

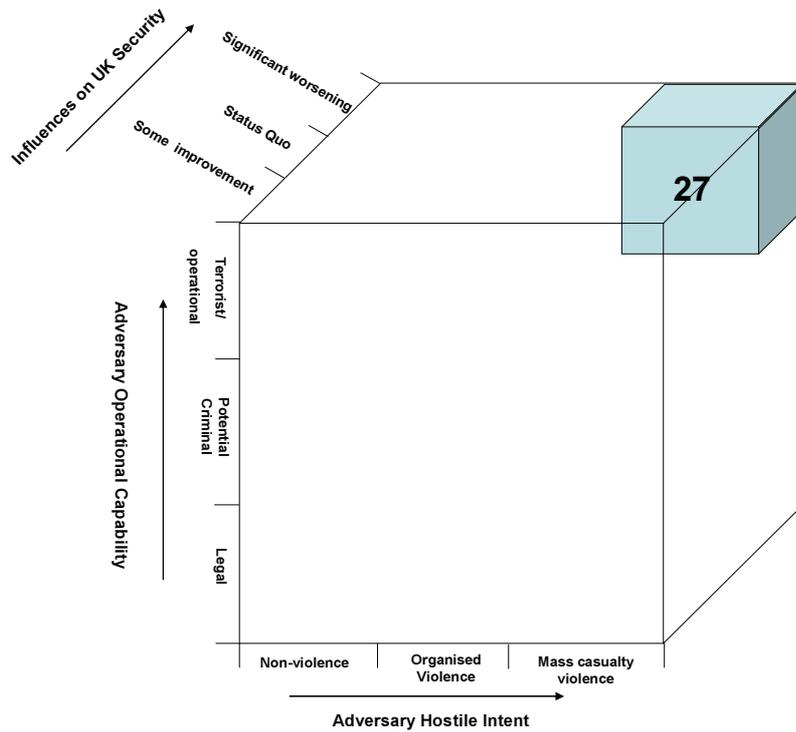


Figure 11. Future security scenario 3

Our illustrative scenario revolves around several simultaneous bomb attacks. Race relations in the UK have degraded significantly from today, and different communities have become highly polarized and insular. Domestic white supremacist groups have decided to defy the international goodwill message of the Olympics by mounting a series of mass-casualty attacks against a particular UK migrant community.¹²⁶ They have carried out a coordinated series of vehicle-borne remote-detonated explosions against several important religious sites in London, causing significant casualties. This has been followed by a propaganda campaign on the internet including threats of further attacks unless the Government reverses its policy on immigration and multiculturalism. The security implications are considerable; the degradation in UK social cohesion will decrease the amount and quality of intelligence and information received by the authorities regarding terrorist activities. The emphasis will move to post-attack management, and managing the information fallout will demand strong public diplomacy to stem outrage and to prevent mass public disorder.

Scenario 4: this scenario represents a similar degree of global instability to today, but one that is populated by groups possessing both the intent and the sophistication to mount devastating mass-casualty attacks. It is represented by cube 17 (Figure 12).

¹²⁶ The immediate detrimental effect of specific communities that perceive themselves to be directly under attack has been seen before in events as diverse as the nail-bomb attacks carried out by David Copeland in Brixton and Brick Lane during April 1999 and the severe public disorder in Lewisham (1977) and Southall (1979) following events organised by outside extreme-right wing elements and seen as provocative by the local community.

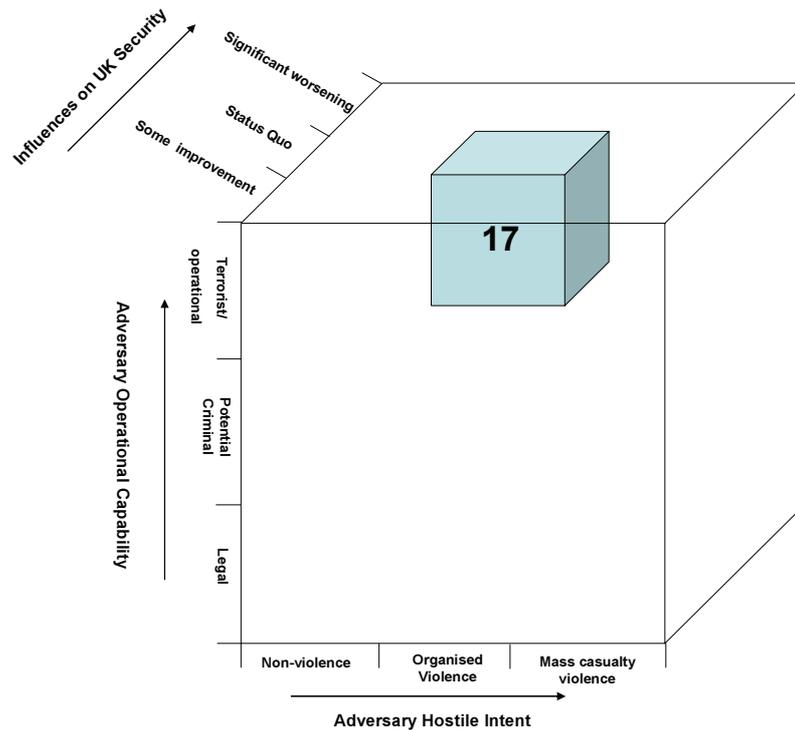


Figure 12. Future security scenario 4

This illustrative scenario concerns an attack mounted by a Jihadist cell aligned with al-Qaida’s ideological worldview. Seeking to inflict significant casualties during the Games, the cell has mounted a number of effective attacks, occurring near-simultaneously. These attacks consisted of the use of suicide bombs, detonated during a morning in the lobby of four leading central hotels, with the apparent aim of targeting representatives of several Western Olympic teams. These four attacks caused significant loss of life and damage to the hotels, with subsequent disruption to the surrounding areas.

Scenario 5: this scenario takes place in the same future as scenario 4 and is therefore also represented by cube 17 (illustrated in Figure 12). It is provided as an illustrative example of how a different attacker modus operandi will demand different a security response, albeit within the same future environment.

In this scenario, an individual has taken a container of an unknown chemical liquid aboard a busy London Underground train during rush hour. Immediately prior to its departure from a major London station, the individual opens the container and allows the chemical to spill onto the floor of the carriage, he then leaves the train as the doors are closing. As the train moves to the next station, a large number of passengers aboard the carriage are overcome by the chemical, with symptoms including vomiting and respiratory difficulties. With the passenger emergency alarm having been activated, the train goes to the next station, stops, and its doors open. Those passengers not incapacitated attempt to flee the train, intermingling with passengers already on the platform and seeking to escape from the Underground network via the station’s exits.

Scenario 6: this scenario takes place in a global environment that exhibits some improvement from today. However, it is recognised that hardcore support for, or resistance

against, certain issues may persist even in the absence of wider traction among the public. The groups discussed in this scenario are in the planning stages of violent action. It takes place in cube 5 (Figure 13).

Our illustrative scenario centres on the intention of a disparate amalgamation of groups, notably those of an anarchist and anti-capitalist outlook, converging on the City of London in order to engage in violent and large-scale public disorder. These protests are focused on one or more leading sponsors of the Games. The groups’ plan, which has been developed via online interaction between a number of individuals, is to cause as much damage as possible to the corporate offices and property of sponsors, as well as attacking other commercial premises and symbolic sites. Several hundred individuals are expected to convene in the City of London for these actions, coming from both the UK and more widely, notably Europe and North America.

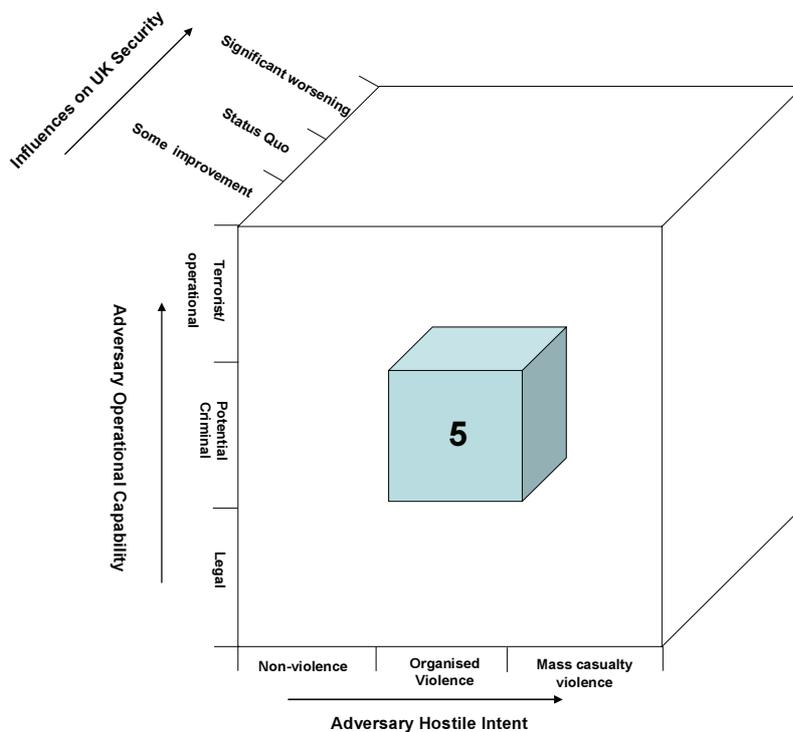


Figure 13. Future security scenario 6

Having constructed these six illustrative scenarios representing a broad range of future security environments, it is now possible to demonstrate the contrasting demands this will place on the UK’s security apparatus.

4.4 Assessing the capability implications of potential environments

The RAND study team has constructed a broad list of 41 domestic security capabilities covering the full gamut of security instruments that allow the UK to maintain domestic security, and which will be relevant to pre-empting/responding to security threats during the 2012 Olympics. These range from CCTV and intelligence gathering activities to

Explosive Ordnance Disposal (EOD) and armed military assistance. The study team then made qualitative judgments about the utility of each capability against the six sub-cube scenarios detailed above.

The judgments were made on the basis of the perceived relevance and operational utility of each capability against the nature and severity of the threat. Taking the scenarios in turn, each security capability was evaluated within it and graded as being either as: of critical importance, of importance, of general usefulness, or of limited use. The colour-coding shown in Figure 14 is now used to present the results of this analysis.

Critical	
Important	
Useful	
Limited	

Figure 14. Colour coding of security capabilities

In order to arrive at these value judgements, the RAND study team made reference to CONTEST, the Government's long-term Counter-Terrorism Strategy for the UK developed in early 2003.¹²⁷ CONTEST is based on four streams:

- 1) Prevent terrorism by tackling its underlying causes;
- 2) Pursue terrorists and their sponsors;
- 3) Protect the public and UK interests; and
- 4) Prepare for the consequences of an attack.

Each security capability falls naturally under one or more of the CONTEST headings and this provides a basis for judging its utility in any given scenario. It is possible to group the list of capabilities on the basis of these four categories of activity. This helps to facilitate an understanding of whether or not a particular security capability will be relevant and to what degree. The results of this analysis are presented in Figure 15.

¹²⁷ For a succinct description of the CONTEST strategy see: Hazel Blears, *RUSI Speech* (22 May 2005) <http://press.homeoffice.gov.uk/Speeches/02-05-sp-tools-combat-terrorism>

Capability	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Explosive Ordnance Disposal (EOD)	Black	Red	Red	Red	Green	Green
Chemical, Biological, Radiological, Nuclear (CBRN) EOD	Black	Black	Black	Black	Red	Black
Evidence Gathering and Investigations	Yellow	Red	Red	Red	Yellow	Yellow
Forensics	Yellow	Yellow	Yellow	Red	Red	Green
Criminal Justice Process	Red	Yellow	Yellow	Yellow	Yellow	Yellow
Surveillance	White	White	White	White	White	White
CCTV	Red	Yellow	Red	Red	Red	Yellow
Covert (Area)	Green	Yellow	Yellow	Green	Green	Yellow
Covert (Individual)	Green	Red	Red	Black	Black	Yellow
Overt	Yellow	Black	Yellow	Black	Black	Yellow
Armed Response	White	White	White	White	White	White
General	Black	Black	Yellow	Green	Yellow	Black
Suicide Terrorism	Black	Black	Black	Yellow	Yellow	Black
Armed intervention (SWAT)	Black	Red	Red	Yellow	Red	Black
VIP Protection	Black	Yellow	Green	Green	Black	Green
CBRN First Responders	Black	Black	Black	Green	Red	Black
Static Weapon/Explosives/CBRN Detection (split)	Black	Black	Red	Black	Red	Black
Intelligence Gathering	White	White	White	White	White	White
Human Intelligence (HUMINT)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Open Source Intelligence (OSINT)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Signal Intelligence (SIGINT)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Intelligence Analysis, Assessment and Dissemination	Red	Red	Red	Red	Red	Red
Communications	Red	Red	Red	Red	Red	Red
Biometrics	Black	Black	Green	Black	Black	Yellow
Other Government Agencies Interaction/ Command and Control (C ²)	Yellow	Yellow	Red	Red	Red	Yellow
Information/Media Strategy/Operations	Yellow	Green	Red	Red	Red	Yellow
Information Assurance/Security	Black	Black	Yellow	Black	Black	Black
Critical National Infrastructure (CNI) Protection	Yellow	Black	Black	Black	Black	Green
International liaison	Green	Yellow	Yellow	Green	Green	Green
High Visibility Policing (HVP)	Yellow	Green	Yellow	Red	Red	Red
Crowd Control/Public Order	Red	Black	Red	Green	Green	Red
Public Disorder/Civil Unrest	Yellow	Black	Red	Red	Red	Black
Search & Rescue	Black	Black	Yellow	Red	Red	Black
Casualty Reception/Handling	White	White	White	White	White	White
Mass Casualty Handling	Black	Black	Yellow	Red	Red	Black
Decontamination Facilities	Black	Black	Black	Black	Red	Black
Border Control/Defence	Green	Yellow	Black	Yellow	Yellow	Yellow
Military Assistance	White	White	White	White	White	White
Airspace Control/Defence	Black	Black	Black	Black	Black	Black
Maritime Control/Defence	Black	Black	Black	Black	Black	Black
Military Aid to the Civil Power (MAC(P))	Black	Green	Green	Black	Black	Black
Military Aid to the Civil Authority (MAC(A))	Black	Black	Green	Green	Green	Black
CBRN assistance	Black	Black	Black	Black	Black	Black
Physical Security (Area) Transport	Yellow	Black	Yellow	Yellow	Red	Red
Physical Security (Point) Premises	Yellow	Green	Yellow	Red	Black	Red
Contingency Planning	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Exercise	Black	Yellow	Yellow	Yellow	Red	Green
Operational C ²	Red	Red	Red	Red	Red	Red
Specialist Search	White	White	White	White	White	White
Pre-incident	Black	Yellow	Black	Black	Black	Black
Post-incident	Black	Black	Red	Red	Red	Black
Personnel Vetting	Black	Yellow	Black	Black	Black	Black
Community Liaison	Yellow	Yellow	Red	Red	Red	Green

Figure 15. Identifying security utility within each future security scenario

It is important to stress once again the illustrative nature of the six scenarios developed here. This capability analysis represents the widely differing levels of utility each security instrument offers. For example, the results highlight three capabilities that are flagged as 'critical' across every one of the six scenarios: Intelligence Analysis, Assessment & Dissemination; Communications; and Operational command and control. Conversely, the Armed Response capabilities, something that might be expected to figure as being of critical importance, proves only to be of sporadic utility across the range of scenarios considered. Logically therefore, operational preparations and contingency planning should take both of these indicators into account.

4.5 **Thinking systematically about security in 2012**

It is impossible to predict now the exact nature of the security threat that will impact on the Olympic Games in 2012, but we have demonstrated the feasibility of creating a method to think logically and systematically about the range of potential future security environments that could exist in 2012.

Using the model we have developed will enable us, working in conjunction with security planners, to define a range of future security environments that are considered to be most plausible. It will then be possible to create as many potential scenarios as necessary, with each one having varying implications for current security planning and preparations for future operational response. The implications for a greater or lesser number of operational capabilities can then be mapped across each selected future security environment and the indicative scenarios that have been developed within it.

The model and its accompanying capability assessment process are both highly flexible and infinitely scaleable in their implementation. Both are capable of operating to satisfy high level strategic planning needs or, by utilising much greater detail, meeting those needs at the operational and tactical levels.

APPENDICES

Appendix A: Meta-analysis framework

In order to prioritise the meta-analysis, RAND Europe identified key policy themes for mega-events to take into account through a background literature search and through expert knowledge of the project team. The themes were used to create a matrix with the three stages of Olympic staging (planning, delivery and legacy). This matrix was then used a search tool for the meta-analysis and populated with evidence and the key issues and questions that could be addressed with an appropriate evidence base.

Themes	Planning	Delivery	Legacy
Health <ul style="list-style-type: none"> • Sport • Health • Obesity • Public Health 	<p>Matrix to be populated with potential studies and questions for London 2012</p>		
Governance <ul style="list-style-type: none"> • Change management • Inter-agency working • Performance monitoring • Public finance • Accountability • Scaling service provision 			
Infrastructure <ul style="list-style-type: none"> • Land use • Transport • Regeneration • Environment 			
Socio-economic development <ul style="list-style-type: none"> • Economic development • Culture • Branding/profile • Tourism 			
Human resources <ul style="list-style-type: none"> • Education • Skills • Employment • Volunteering 			
Security <ul style="list-style-type: none"> • Terrorism • Targeted disruptions • Serious crime 			
Identity and community <ul style="list-style-type: none"> • Immigration • Multi-culturalism • Olympic ideals • Civic engagement 			