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A challenging metro agenda

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Metros are increasingly at the heart of the sustainable development of large cities with a sufficient budget—a and they confront decision-makers with weighty decisions. Some are shining examples of what is possible, but many are not the mature, sustainable businesses that they need to be (and that many assume they are); instead they face daunting problems while others are in crisis. Because metros are strategic mega-projects, with great potential for good or ill, this matters. Moreover this situation has not materially changed, advances being offset by an increasingly challenging environment.

It has become clear that major change is required, and that consensus behind a new agenda is needed, founded on an understanding of the issues. This article seeks to outline what is needed from this new consensus.

Context

Metros have many stakeholders, and it is evident that major change requires stakeholder interests to be aligned, which requires focus on generating consensus, in turn founded on shared understanding and improved project development. Often, however, this does not exist.

Four metro characteristics are central to the subject matter. First is their strategic long-term nature and the public policy objectives they are designed to serve. Metros are long-term mega-projects that almost always require large public funding and are political in nature. Their clients, objectives, policies and circumstances often all change as they develop. Second is their financial structure. Its demanding nature is frequently little understood—and a single bad decision can undermine metro finances. Third, metro development has been described as a huge exercise in the management of complexity. This results from their location, technical characteristics and multiple stakeholders. Allied to this complexity is risk—it’s reality and nature are rarely recognised. Last is the requirement that they serve their community for many decades, for which a sustainable business model is needed; the prerequisites for this often do not exist.

The sector faces unparalleled change, and today’s successful metro will not necessarily remain successful tomorrow. Rising expectations are likely to face limited public funding and rising security concerns, whilst technological innovation and improvements in procurement and contracting offering new opportunities.

This article draws on two sources to highlight the challenges ahead. First is a survey of CoMET and Nova metro managers on the key challenges they face; and second is the author’s research, that incorporates nine in-depth case studies of public and privately procured new-build metros in Asia and the UK.

Survey of existing operators

Table 1 (opposite) summarises the major challenges as perceived by 15 metro operators who responded to the survey.

Some responses appear to represent well the challenges ahead, while others appear inward-looking—operators are struggling with formidable problems. It is notable that:

- These challenges focus on only some of the factors required for a sustainable metro business. They do not appear to be part of a holistic strategy to tackle the interrelated issues of costs (that have to be
paid for), fares (that provide much of the funding) and public funding (that provides most of the remainder).

• Instead, the focus is on: reducing operating costs by ever-improving productivity, providing a reliable service and developing non-fare revenues. There appears to be a fear of raising fares.

• Some operators have yet to change to complete the transition to customer-facing operations.

• Asset management is often interpreted as crisis replacement of assets, rather than the planned whole-life maintenance / enhancement / replacement that also require planned funding.

• Operators often face rapidly changing circumstances. Some threaten their continued existence. Others open up opportunities. The need for strategic planning and internal flexibility to manage their future development is not always present.

• Several issues are surprisingly rarely mentioned: those of stakeholder engagement, the development of new lines, fares policy, legislation / regulation, bus integration, and security from terrorism.

Research into new-build metros

New projects often make the headlines and are widely supported. Less reported is their partial success in delivering expected results. "Good' projects can provide the public transport backbone, while 'poor' projects can undermine the same sustainability agenda. Table 2 points to the scale of this problem. Until very recently, costs forecast when the 'construct' decision was made out-turned at +50 to 100%, ridership and revenues at one- to two-thirds and operating costs substantially higher. Recent research shows that, under improved procurement / contracting, implementation costs and times are turning out to be more predictable, but ridership and operating costs have not yet improved. These shortfalls in performance

<table>
<thead>
<tr>
<th>Importance</th>
<th>Challenge</th>
<th>Action by</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Need for funding</td>
<td>Government / Operator</td>
<td>Requires govt to define fares and funding regime; operator to market the system and manage costs</td>
</tr>
<tr>
<td>2</td>
<td>Improving service quality</td>
<td>Operator</td>
<td>Requires operator to be customer-facing</td>
</tr>
<tr>
<td></td>
<td>Asset management</td>
<td>Operator</td>
<td>Whole-life asset maintenance and replacement</td>
</tr>
<tr>
<td></td>
<td>Business growth/ survival</td>
<td>Operator</td>
<td>Responding to strategic opportunities and threats</td>
</tr>
<tr>
<td>3</td>
<td>Managing external pressures</td>
<td>Operator</td>
<td>Managing the metro stakeholders</td>
</tr>
<tr>
<td></td>
<td>Internal Management</td>
<td>Operator</td>
<td>Flexibility as circumstances change</td>
</tr>
<tr>
<td></td>
<td>Competition</td>
<td>Government</td>
<td>Level modal playing field / integration</td>
</tr>
<tr>
<td></td>
<td>Over-crowding</td>
<td>Government / Operator</td>
<td>Pricing, operational management, capacity expansion</td>
</tr>
<tr>
<td>4</td>
<td>Safety and security</td>
<td>Operator</td>
<td>Personal security, terrorism threat</td>
</tr>
<tr>
<td>5</td>
<td>Equality and inclusion</td>
<td>Government</td>
<td>Access for the frail and disabled</td>
</tr>
</tbody>
</table>

TABLE 2 : RECORD OF NEW-BUILD METRO SUCCESS

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Outturn compared with forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Capital cost</td>
</tr>
<tr>
<td>1973</td>
<td>Europe/ North America</td>
<td>Average +50%</td>
</tr>
<tr>
<td>1986</td>
<td>USA</td>
<td>Average +50%</td>
</tr>
<tr>
<td>1990</td>
<td>Developing cities</td>
<td>Half +50 to +300%</td>
</tr>
<tr>
<td>1990</td>
<td>USA</td>
<td>+17 to +156%</td>
</tr>
<tr>
<td>1996</td>
<td>Worldwide</td>
<td>-15 to +500%</td>
</tr>
<tr>
<td>1998</td>
<td>Worldwide – private</td>
<td>No improvement over public sector</td>
</tr>
<tr>
<td>1998</td>
<td>UK, USA</td>
<td>2 out of 13 'successful'</td>
</tr>
<tr>
<td>2000</td>
<td>Asia – private</td>
<td>No improvement over public sector</td>
</tr>
<tr>
<td>2000</td>
<td>Worldwide</td>
<td>-46 to +200%, average -46%</td>
</tr>
<tr>
<td>2000</td>
<td>North America, UK</td>
<td>-96 to +1%, average -51%</td>
</tr>
<tr>
<td>2004</td>
<td>Asia, UK private / public</td>
<td>5 of 6 on budget, 1 +100%</td>
</tr>
</tbody>
</table>

Note: Table shows how the projects outturn compared with forecasts when committed. Sources are in references.
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are reflected in wider economic, social and environmental impacts.

Does this matter? It clearly does. Failure leads to a misallocation of resources, shortfalls in achieving strategic objectives, undermines management autonomy and creates opposition to future projects. It is characterised by over-design/under-use of assets, poor performance, ever-larger financial crises, and calls for change and ‘instant solutions’.

The issues

Change requires a shared understanding of the following key issues by key metro stakeholders, in particular government and operators. This does not always exist.

Role of government

Many problems stem from a lack of clarity about government’s role. There is now much evidence of the limits to private sector participation (PSP) that helps clarify this. Government needs to develop a strategy that defines the compelling purpose for the metro. This always depends on creating a sustainable metro business – that is, an enduring organisational capacity to deliver service within parameters set by government. Government needs to provide some degree of predictability in planning, funding, coordination and regulation. Huge performance improvements then become possible.

The private sector can, depending upon circumstances, offer much. There is considerable experience of PSP worldwide. Some major new-build concessions have delivered impressive performance in difficult circumstances. But this does not change the essential role of government or the need for large public funding.

Role of operator

His critical role is little recognised by many stakeholders. A key asset, he is arguably as important as the metro physical assets. Too often however the focus is on physical infrastructure, and on the operations only when things go wrong; and too often governments make decisions without engaging the operator effectively. There are shining examples of operators who deliver huge value. Many wish to and could deliver much more.

Sometimes the operator is part of the problem. He needs a holistic approach to strategising, in which demand, fares, costs and funding are central. Increasingly operators realise that they need to be proactive in shaping their future, by engaging and in some respects educating government into the challenges faced. This first requires government to become an active partner. The operator needs a framework providing clear management objectives, autonomy to manage and some dependability of support – without this, the focus of management becomes increasingly short-term.

Metro finances

These are often ill-understood. New-build costs are often measured in euro billions and, despite frequent hopes, most need to be funded by government from taxes and/or borrowings, justified to secure wider public policy objectives. Both operating costs and revenue are large and uncertain and the revenue surplus, if any, is very uncertain. There is evidence that often, real operating costs are increasing while real fares are reducing. Provision needs to be made for costly asset enhancement and replacement.

The scale of the financial challenge arguably requires a funding strategy to determine ‘who should pay and how’ over the long term; but this rarely exists. Instead the focus is on financial engineering that may provide up-front finance for new projects but avoids the underlying funding issue. Fundamental to financial sustainability is a sustainable fares policy; some examples exist of medium or long-term contractual arrangements that deliver this, but they are the exception.

Operator’s policy options

Information on metro demand and supply characteristics needed to define future fares/operations policy is often surprisingly sparse. The fact that operating costs will often increase despite productivity gains, increased fares will usually increase revenues (and help fund the system), and non-farebox revenues are not usually of central importance, is not always recognised. Policy needs to be based on sound evidence and international evidence is now available to complement local survey results. This can considerably broaden the operator’s policy options and improve his performance.

Development of new-build projects

Despite recent improvements in procurement, there is compelling evidence that project development requires fundamental change, in three respects:

Focus - This needs to be consistently on operations. Apparently self-evident, the focus is usually different and emphasis is put on: winning the contract, being ground-breaking, the opening and the physical infrastructure - with little attention to operations.

Development process - by the time the metro opens it is too late to transform what is often an unexpectedly poor performance: most revenues and operating costs are committed by past decisions. Planning largely ignores risk and provides poor basis for the critical ‘construct’ decision. Then, construction and commissioning focus on ‘implementation to time, cost and specification’. Throughout there is little interest in operations or influence by an operator. Continuity in thinking/staffing is essential but rare.

Planning – The future cost of poor metro planning is high in physical, financial and operational terms, yet the resources put in and their output are often poor. Its role is interpreted as technical optimisation in a certain future, rather than helping generate consensus behind a sound business case for an uncertain future. Infrastructure planning may not stand the tests of implementability and
financing, and forecasts are usually optimistic/misleading.

Towards a new agenda
There are beacons of success in the metro world, in developed and developing cities. But there is also much that could be, and needs to be better. The good news is that practical change is achievable. The main requirements to develop a sustainable metro business appear to be:

- The active engagement of government with operator for issues that affect the operator.
- Government focus on creating the sustainable operating business, upon which the achievement of its wider policy objectives depends. This requires the operator to be established with substantial management autonomy.
- Operators who are outward-looking in engaging with, and educating other stakeholders, helping create and sustain the sector framework.
- Metro finances that are much better understood (such that stakeholders recognise the imperative of creating a longer-term framework), with a sustainable fares policy central to this. Longer-term planning for asset management and investment is then possible.
- Creating a template for developing new-build projects (one does not exist). This needs to be conceived as a more-or-less continuous process, focused on key decisions. Risk analysis and management need to be at its centre, as should operator influence.
- Fundamental change to the planning function for new-build projects. Planning is necessary and important. Front-end quality planning is needed to identify promising projects. Infrastructure planning needs to be implementation and financing oriented; and all forecasts should routinely be reality-checked to establish their credibility.

The outlook is one of pressing need and opportunity in equal measure. The requirement is for a new agenda founded on the practical experience of success and partial success. This requires fundamental change to existing attitudes and practice that requires education, understanding and commitment. Then, decision-makers will increasingly be able to make weighty decisions that stand the test of time; operators will be able to deliver the service demanded by their customers; and metros will increasingly becoming the centrepiece of sustainable cities, as foreshadowed in UITP’s recent position paper.

Notes
1. R.J. Allport, Halcrow, London. The author is undertaking a PhD at Imperial College London: ‘Improving Decision-Making for Major Urban Rail Projects’
2. R. Anderson, RTSC, Centre for Transport Studies, Department of Civil and Environmental Engineering, Imperial College London, South Kensington, London.
3. Metros are defined as urban railways that carry a mass ridership rapidly.
4. CoMET (Community of METros) comprises 10 metros carrying >0.5 billion passengers per year. Nova comprises 12 smaller-scale metros
5. The authors are most appreciative of this cooperation
6. These include an understanding of: demand, demand/service elasticities, changing customer expectations, fares and fares stability, non-farebox revenues, operating / asset enhancement/ asset renewal costs, potential for productivity improvements, funding and funding stability.

The opportunity cost of metros is large absolutely and in relation to government spending. The Singapore government estimated the cost of the North-East sector line as the equivalent to the annual budget for education and health for one year.

The authors’ 9 new-build case studies range between EUR 0.1 to 1.7bn

The CoMET and Nova benchmarking clubs provide usable information in a constructive way to their members

Bibliography
a Allport, R.J. “Operating Risk,” Civil Engineering, Institution of Civil Engineers UK (Vol.156, issue 3, August 2005)

Examples include:

Send your questions and comments to: Allportr@halcrow.com copy to editor@uitp.com