Transforming Mobility in Megaprojects: The Mobility for Megaprojects (MxM) Framework

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By Giovanni Moscatelli, Joe Jabbour, Arturs Smilkstins, Julien Bert, Markus Hagenmaier, Ingmar Schaefer, and Ahmed ElMessalami

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Transforming Mobility in Megaprojects: The Mobility for Megaprojects (MxM) Framework

Megaprojects have expanded globally. They vary in format and focus from mixed-use urban developments to entertainment and tourism destinations, residential communities, institutional campuses, or industrial and logistics hubs. Such projects stimulate global economic growth by creating jobs, localizing value chains, attracting foreign direct investment, and boosting demand for goods and services. Increasingly, they are shaping the future of cities, making them more efficient, livable, and sustainable as they keep pace with rapid urbanization. Many are designed to support healthier, more connected ways of living, and more sustainable business and consumption practices. There is growing global interest in developing megaprojects due to the significant economic and urban benefits they offer — for example, Saudi Arabia is investing an estimated $850 Billion on developing megaprojects.

However, these projects' immense size and scope bring significant mobility challenges. To fulfill their economic and social promise, they must connect seamlessly to city-wide infrastructure, reduce rather than increase congestion, support sustainability targets, and enhance the visitor experience. But six "pain points" often undermine megaprojects' mobility effectiveness:

1. Mobility is often overlooked during the ideation and strategy phase of megaproject development due to time and budgetary pressures.

2. Less focus is often placed on megaprojects' city-wide integration, creating severe congestion at entry and exit points.

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3 Similarly, there is less focus on integration with public transport, and future mobility trends like having EV charging stations leading to last resort "firefighting".

4 Mobility supply and demand are often not considered as part of megaprojects' land use planning, leading to delays and rework.

5 Mobility often faces delays and re-design, due to design due to sub-optimal design and lack of a clear governance model.

6 As mobility has low returns, government investments are often required to attract private investors.

Australia's Sydney Olympic Park, for example, highlights the importance of mobility planning during the concept design phase of megaprojects. Initially developed for the 2000 Olympic Games and envisioned as a thriving mixed-use urban districts post-Games, the area has struggled with mobility challenges. The Sydney Olympic Park Masterplan 2050, intended to guide its transformation, did not fully address associated infrastructure needs, particularly in public transport and road networks. Local stakeholders, including councilors and residents, say that the plan is unable to accommodate the projected addition of 13,000 new dwellings, potentially increasing traffic congestion and inconvenience for current and future residents.

To address such challenges, BCG has created the Mobility-for-Megaprojects (MxM) Framework—a structured tool designed to comprehensively assess, diagnose, and support the development of mobility ecosystems in complex urban developments. Piloted in a large Middle Eastern urban project covering approximately 15 km² and valued at $25 billion, the MxM framework has demonstrated its potential as a transformative tool in modern mobility planning.

The MxM Tool: A Comprehensive Solution for Megaproject Mobility

The BCG Mobility-for-Megaprojects tool was developed as a comprehensive, data-driven solution to tackle the unique mobility demands of megaprojects. It was designed based on extensive research, was battle-tested in megaproject developments, and distills best practices from global benchmarking. The tool evaluates mobility by focusing on six critical categories: planning and governance; infrastructure and assets; operations and flow; sustainability; user experience; and technology. Together, these categories help users identify both strengths and critical gaps, establishing a comprehensive baseline for effective, long-term mobility planning. Key topics within each category include:

Planning and Governance

- **Project-wide mobility strategies:** aligning the mobility approach with broader city-wide goals
- **Governance models:** establishing governance structures to support seamless project execution
- **Regulatory frameworks**: setting regulatory standards for alignment across all mobility activities

Infrastructure and Assets

- **Road network accessibility:** confirming connectivity to support high-capacity demands
- **Intermodal connectivity:** facilitating smooth transitions between different transit modes
- **Parking capacity:** assessing parking infrastructure readiness to manage peak visitor volumes

Operations and Flow

- **Internal traffic management:** managing traffic to reduce congestion and enhance accessibility
- **Seamless connectivity:** integrating transit modes to maintain seamless movement
- **Logistics:** streamlining logistics systems to support fluid visitor and operational flows

Sustainability

- **Low-emission transit options:** implementing environmentally friendly transit solutions
- **Emission reduction targets:** setting clear emissions targets for reducing environmental impact
- **Financial sustainability:** developing financial models to ensure long-term viability of operations

User Experience

- **Accessibility:** designing accessible transit options to serve all users
- **Safety:** prioritizing user safety through thoughtful planning and risk management
- **Intuitive design:** creating intuitive navigation and wayfinding for a seamless user journey

Technology

- **Real-time data collection:** leveraging data to monitor and adjust mobility operations
- **Cybersecurity:** ensuring robust security for all digital mobility interfaces
- **Unified interfaces:** providing cohesive digital platforms that enhance user engagement.

To ensure a comprehensive diagnostic framework, a three-layers structure is developed (Figure 1):

1. Mobility Categories (Layer 1)

These represent the six main verticals of the mobility framework. They form the foundational categories for assessing the mobility ecosystem.

2. Mobility Strategic Objectives (Layer 2)

These objectives are central to any mobility ecosystem and were derived through extensive research, expert interviews, and case studies. Each group of strategic objectives aligns with a corresponding framework category from Layer 1.

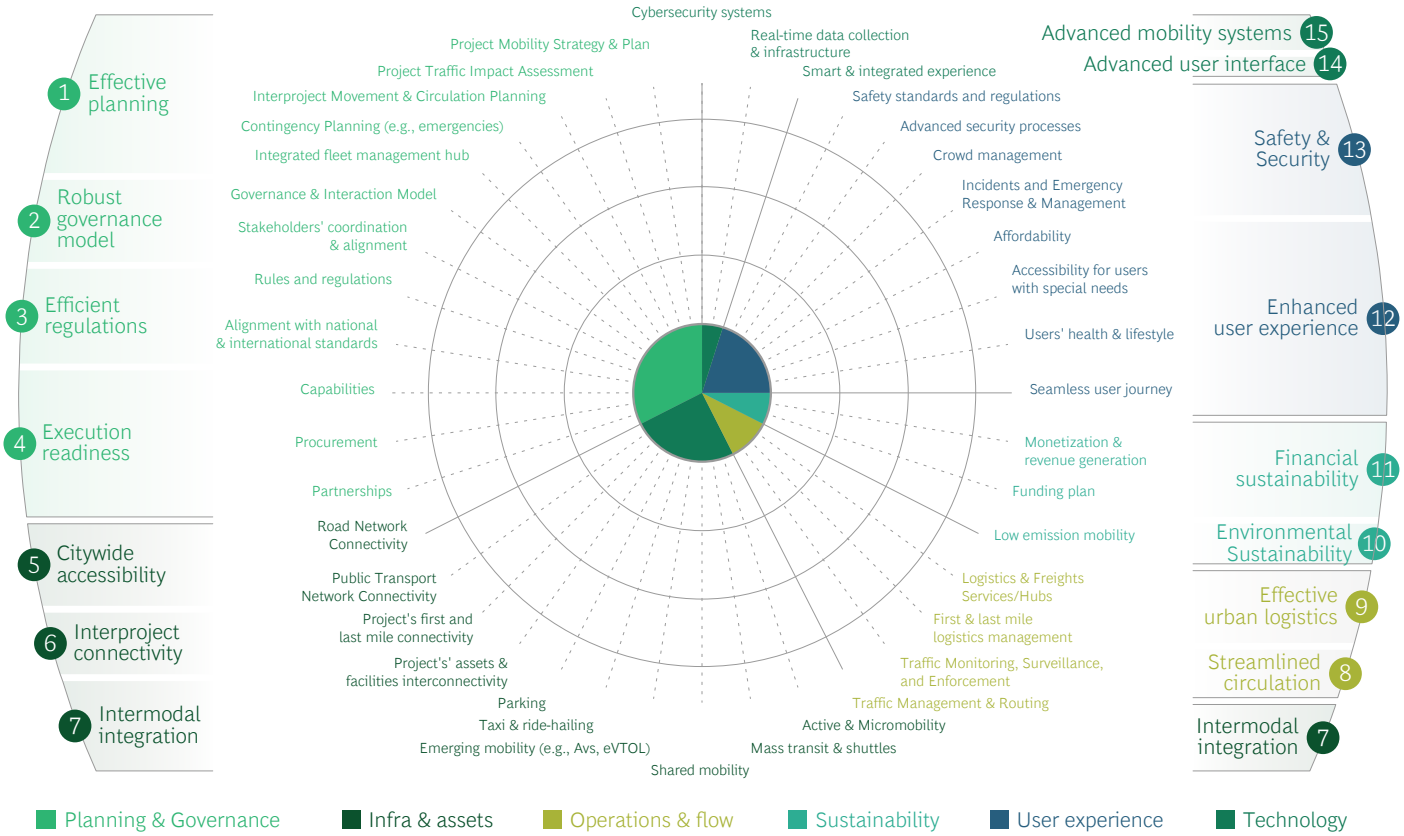
3. Mobility Dimensions (Layer 3)

Each strategic objective is broken down into a set of mobility dimensions. Diagnostic analysis is conducted at the dimension level based on 300 targeted questions. These are then scored according to transportation and mobility best practices, with the cumulative results informing the assessment of the corresponding strategic objectives (Layer 2) and categories (Layer 1).

This layered structure offers two key advantages. The first is a precise scoring methodology: by focusing diagnostic efforts on the dimensions, results cascade accurately to their respective strategic objectives and framework categories. The second is transparent and accurate reporting: the framework provides detailed scores for components across all three layers, enabling precise identification of gaps in the mobility ecosystem

FIGURE 1

MxM Framework: "Mobility-for-Megaprojects" framework along 40 dimensions



Applying the MxM Framework: A Scalable, Five-Step Process

The MxM tool follows a structured five-step approach designed to deliver a comprehensive mobility assessment and actionable insights for large-scale urban developments.

Step 1: Gather data
The process begins with data gathering. Specialists review all relevant project documentation, including urban plans, traffic studies, and infrastructure assessments, and conduct stakeholder interviews to ensure a robust and full understanding project's mobility ecosystem.

Step 2: Apply diagnostic
Next, a detailed 300-question checklist is applied across 40 dimensions to evaluate the project's mobility strengths and pinpoint areas for improvement. Checklist questions are scored against industry best practices.

Step 3: Analyze scoring and identify gaps
The scoring process reveals specific gaps by dimension, prioritizing areas that require immediate improvement. For example, if intermodal integration scores well but parking capacity scores poorly, the tool flags parking as the higher-priority issue.

Step 4: Recommend tailored solutions
Based on the diagnostic profile, the MxM tool will help in developing customized recommendations and identifying potentially useful initiatives. (As part of the tool development process, BCG identified over 300 unique mobility initiatives distilled from global best practices.)

Step 5: Develop a roadmap
Finally, a roadmap is generated to prioritize immediate actions and phased long-term strategies, ensuring that mobility improvements align with the project's overarching goals and are scalable over time.

Applying the MxM Tool: Middle East Pilot Case Study

To validate the MxM tool's impact, we implemented it as a pilot in a major urban development project in the Middle East—a 15 km² project valued at $25 billion. With an anticipated 50 million annual visitors and operations due to commence in just one year, the project faced considerable mobility challenges.

In partnership with the client, we conducted a thorough review of project's documents and studies and interviewed key stakeholders. Topics covered ranged from transit congestion to the complexities of sustainability goals. We then applied the mobility diagnostic, a process that took less than two weeks.

Diagnostic results revealed several critical gaps. For instance, the existing Traffic Impact Assessment (TIA) relied on outdated visitor projections —almost half of the latest estimate—indicating that the infrastructure, including entry and exit points and parking facilities, would be overwhelmed. Severe parking shortages became apparent, with a projected deficit of thousands of spaces during peak times, underscoring the need for urgent capacity expansion.

A full diagnostic report was prepared including assessments across the three key layers: mobility categories; mobility objectives; and mobility dimensions. Working through the layers enabled the development of a transparent, comprehensive, and precise picture of the project's mobility situation and needs.

We then used the MxM tool to prepare a full recommendation for the client to close key gaps, resolve challenges, and be fully ready to commence operations on-time. First we identified all the initiatives that could help address the gaps and challenges, based on global best practices. This resulted in a list of 66 applicable initiatives. We prioritized those that could be implemented to drive the highest impact within one year, yielding a shortlist of 22 initiatives. For example, in the Infrastructure and Assets category, shortlisted initiatives included developing a first and last-mile connectivity plan, refreshing the parking strategy, and detailing the parking management plan. Under Planning and Governance, initiatives included establishing an Mobility Control Center and developing partnerships with service providers across all mobility modes. We then detailed each of the shortlisted initiatives, identifying relevant gaps, concept, impact, and actions.

Finally, we tailored an implementation roadmap reflecting key priorities and interdependencies. Applying the MxM framework early in the project's lifecycle allowed us to identify high-priority areas needing immediate action, ensuring its mobility ecosystem could support its long-term vision. The full process from data collection through to recommendations and roadmap takes approximately 4 weeks, depending on project size. The MxM diagnostic results, along with the recommended initiatives and roadmap, received high praise from the pilot project executives. Consequently, they decided to formalize these results and recommendations into a concrete action plan to achieve full mobility readiness.

Conclusion

Megaprojects will have different mobility needs and challenges. For example, urban mixed-use hubs demand transit integration to support high passenger traffic. Entertainment sites, meanwhile, may be at some distance from cities, with large daily fluctuations in entry / exit traffic and the need for creative on-site mobility options. And industrial and logistics freight hubs may need to integrate shipping and rail infrastructure and accommodate large quantities of heavy equipment.

Delivering data-driven insights across every dimension of mobility, and applicable to a range of megaproject types and needs, the MxM tool aligns mobility with the development's overarching vision from the start. And by identifying mobility issues preemptively, the tool enables early detection and resolution of potential bottlenecks, reducing the likelihood of costly operational delays and retrofits. The BCG MxM framework and methodology offer a successful, proven way to rapidly diagnose mobility in megaprojects, and tailor a unique recommendation to enhance overall mobility, accelerate development, and define a fallback plan – depending on project needs. As cities worldwide undertake ambitious projects, the MxM tool empowers developers to create integrated mobility systems, positioning megaprojects like our pilot as benchmarks for a resilient and sustainable urban future.

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About the Authors

Giovanni Moscatelli is a Managing Director and Senior Partner at BCG, the global co-leader of Travel, Transport Infrastructures and Leisure sector, and head of BCG Middle East Industrial Goods practice you can contact him at **Moscatelli.Giovanni@bcg.com**.

Joe Jabbour is a Managing Director and Partner at BCG who focuses on megaprojects and large-scale real estate, infrastructure, and development engagements across the Middle East and you can contact him at **Jabbour.Joe@bcg.com**.

Arturs Smilkstins is a Managing Director and Partner at BCG who focuses on the automotive and mobility space, advising cities and transport authorities as well as OEMs, suppliers, and mobility providers on all aspect of Urban Mobility Transformation, incl. digital, organizational, and operational change programs and you can contact him at **Smilkstins.Arturs@bcg.com**.

Julien Bert is a Managing Director and Senior Partner at BCG who co-leads BCG's Center for Mobility Innovation and advises clients on how to create innovative and state-of-the-art mobility solutions. You can contact him at **Bert.Julien@bcg.com**.

About the Authors

Markus Hagenmaier is a Partner and Associate Director, Mobility Innovation & Digitalization at BCG who co-leads BCG's Center for Mobility Innovation and focuses on CASE trends within the automotive and mobility sectors and you can contact him at **Hagenmaier.Markus@bcg.com**.

Ingmar Schaefer is a Managing Director and Partner at BCG, and is the Middle East lead for Automotive and Mobility with expertise in urban mobility, go-to-market strategy, new business build-ups, and largescale transformations and you can contact him at **Schaefer.Ingmar@bcg.com**.

Ahmed ElMessalami is a Project Leader at BCG, leading diverse engagements across urban mobility, transportation & logistics, urban centers development, large scale transformation, market entry strategies, and development of national strategies, and you can contact him at **ElMessalami.Ahmed@bcg.com**.

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