



Urban mobility – Learnings from the Middle East

Ralf Baron, Thomas Kuruvilla, Morsi Berguiga, Michael Zintel, Joseph Salem and Mario Kerbage

By 2050 67% of the world's population is predicted to live in cities. Across the globe, this is leading to mobility challenges as urban areas struggle to ensure that their populations can move around freely using both public and private transport.

Solving these issues is critical to ensuring that cities thrive and attract the investment and people they need to grow.

The Middle East may have been late to urbanization, but this has provided a unique opportunity to shape its urban-mobility strategies. Rather than adopting a piecemeal approach, leaders such as Dubai are following an ecosystem model that addresses mobility holistically. In this article, the authors explain this new model and the lessons it provides for other cities across the world as they struggle to meet their own urban-mobility challenges.

The Middle East may have been late to urbanization, but that has provided a unique opportunity to shape its urban mobility strategies. Some of its vibrantly growing urban centers, such as Dubai, are now building on best practice from around the world. This experience provides lessons, good and bad, for other cities across the world as they struggle to meet their own urban mobility challenges.



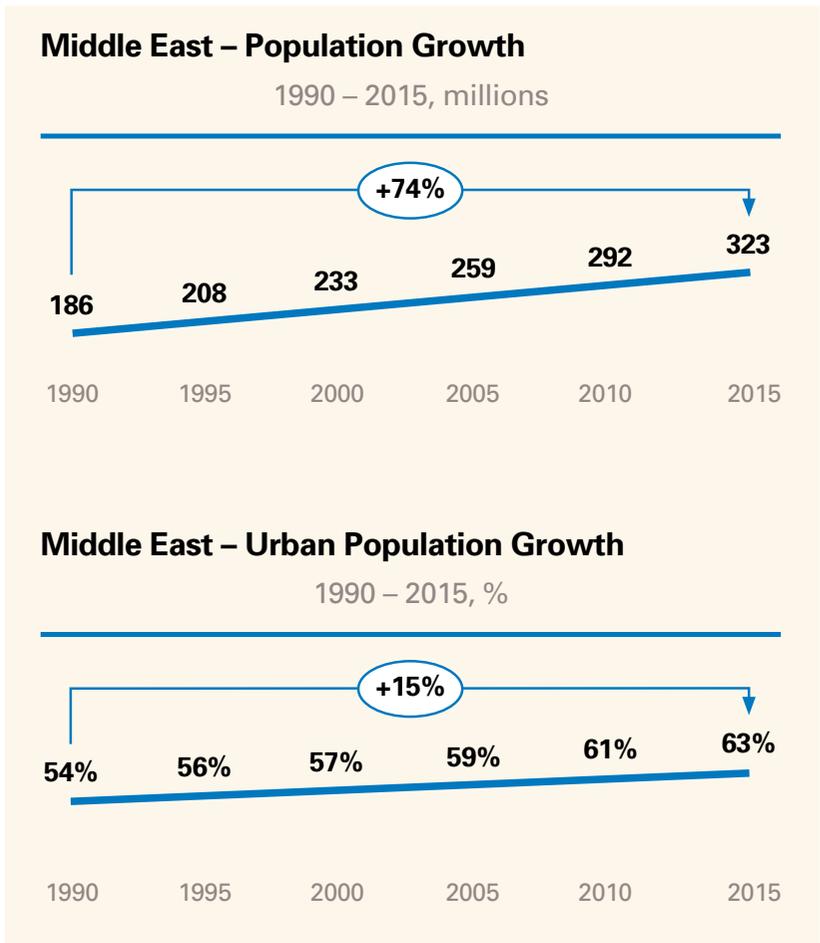


Figure 1: **The current Middle East transport environment**

Source: World Bank – Total population counts all residents regardless of legal status or citizenship

Over the last decades, the Middle East has witnessed fast population growth, growing from 186 million people in 1990 to 323 million in 2015. Its urbanization rate has increased rapidly during the same period, from 54% in 1990 to 63% in 2015. Some countries in the region, such as the United Arab Emirates, Saudi Arabia, Kuwait and others, have been in a position to drive major development and growth initiatives that would allow them to become top global economic performers in record time. These countries must therefore also catch up with standard urban development issues extremely quickly. Being leaders in rapid expansion and urbanization, they have a full set of urban growth challenges on their management agenda:

- **Traffic congestion:** An average trip in Dubai takes 29% longer than it would under uncongested conditions. While this is better than journey times in most large Asian cities (Bangkok 61%, Jakarta 58% and Beijing 46%), it is still behind the best in class in the West (20% or less).
- **Transportation safety and security:** Middle Eastern cities have high road-traffic death rates, although in some countries the situation is improving (for example, the UAE has 10.9 deaths per 100,000 population vs 32.1 per 100,000 in Iran).
- **Public transport cost:** Public transport is expensive. Metros can cost millions of dollars per kilometer of track, and with low oil prices, even major producers are cutting back their budgets.
- **High usage of private vehicles:** The use of public transport in Middle Eastern cities has yet to become common practice, representing only 14.4% of motorized trips in Dubai, for example (Source: UITP).
- **Environmental considerations:** Transportation contributes heavily to a city's air pollution, and a lack of environmental protection measures can lead to disastrous results. Cairo has a pollution index of 95.86, Beirut 87.37 and Tehran 87.22 (source: numbeo 2017).

As another indication, Arthur D. Little's Urban Mobility Index 2.0¹ report, which analyzes the maturity and performance of urban mobility systems around the world, revealed that Africa and the Middle East were the lowest-performing regions, with respective average point totals of 37.1 and 34.1 out of a possible 60. This may be compared with leading cities in Asia and Western Europe, which scored well above 50.

¹Source: http://www.adlittle.com/downloads/tx_adreports/Arthur_D_Little_UITP_Future_of_Urban_Mobility_2_0.pdf

How these challenges are being overcome

Government and public authorities in the Middle East have generally followed one of two models when looking for solutions to address these major transportation challenges.

Transition model

The initial approach decision-makers followed was to invest heavily in roads and public transport infrastructure, raising the transportation network's capacity to absorb the greater demand. This "transition model" is inspired by the evolution of transportation networks in the Western world, where it took more than a century to build, develop and maintain advanced public transport networks (metro, tramway). Cities in the Middle East have tried to follow these models and strengthen transport-mode offers in short time frames, often focusing on roads and rail networks. Governance methods are reinforced in parallel through the launch of transport supervision authorities, which have mixed roles covering planning, investments and regulation (for instance: RTA in Dubai, ADA in Riyadh, PART in Kuwait).

In 2009 Dubai launched a fully automated metro line, followed a few years later by a tramway connecting the dense Dubai Marina area to the rest of the city. In parallel, the amount of road network km-lanes has increased significantly since 2005, with an average CAGR of 4% between 2005 and 2014.



Figure 1: **Dubai Metro**

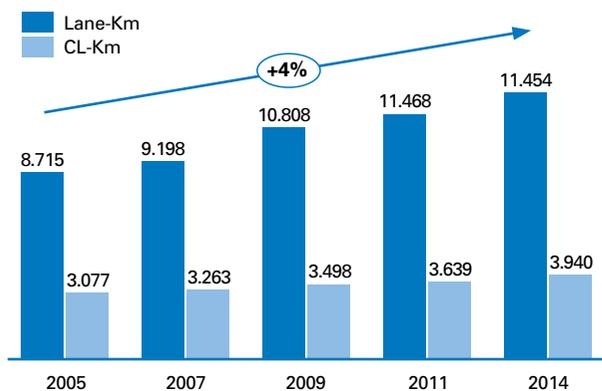


Figure 2: Dubai road network evolution

Similarly, Saudi Arabia recently launched a massive \$130 billion rail investment plan for the next five years. This represents more than half of the total \$240 billion rail investments planned in the GCC region.

While this approach solves short-term urgent issues, such as congestion, it also faces the risk of not being sustainable enough to address long-term difficulties. Addressing the challenge of congestion solely from the supply angle, through investments in traditional transport infrastructure, will not solve the long-term problems for two main reasons.

Firstly, given the very high (and continually increasing) growth rates on the demand side, expansion of infrastructure capacity will not be enough. For example, road capacity in Dubai increased by 36% between 2006 and 2014, yet the number of registered cars in the country doubled in the same period – without including the large inflows of non-Dubai-registered cars entering and exiting the Emirate every day. The city has started to think about new “out-of-the-box” ideas to address the problem differently, as described in the case study below.

Secondly, this traditional approach ignores current trends in urban transportation, particularly around major technological and behavioral changes. Today, we can see clearly that the dominance of the private car as the main means of transportation is coming to an end. The “sharing economy” means services such as e-hailing and car sharing and the rise of digitally enabled transport modes are booming all over the world. Given the young, connected population in the Middle East, this is creating a greater shift in transport habits than in other geographies. For example, in Saudi Arabia 50% of the population is below 25 and 77% owns a smartphone, driving a sharp increase in e-hailing usage – the local Uber service announced a month-to-month increase of 50% in the number of trips taken in 2016.²

Ecosystem model

A few advanced cities have taken different paths, trying new approaches to reinvent their transportation networks in order to respond to challenges. The key principles of these new approaches are to:

- Develop a holistic view of the mobility model ex ante
- Integrate all available mobility modes seamlessly and holistically
- Consider both supply and demand levers to reshape urban transportation
- Effectively leverage innovative, new mobility modes (such as shared or autonomous transport)

Dubai presents a good example of a city that moved from a transition to an ecosystem model. (See the case study.)

²Source: <http://www.arabianbusiness.com/uber-sees-2016-saudi-growth-surge-as-women-need-rides-619282.html>

Case study: Dubai's Road and Transport Authority

Dubai, through its Road and Transport Authority (RTA), has been the front-runner in developing an innovative mobility ecosystem, driven by integration.

This aims to overcome the city's growing transport challenges:

- High congestion – In 2016, there were 600 registered vehicles per 1,000 inhabitants in Dubai, against 180 in Singapore and 390 in Vienna.
- Transport-related fatalities – Seventy-five fatalities per million inhabitants in Dubai, against 35 in Singapore and 25 in Paris in 2016.
- Transport-related CO2 emissions, which reached 3,600 kg CO2/capita in Dubai in 2016, against 1,300 in Singapore and 1,100 in Paris.

Beyond tackling transport challenges, RTA has also been supporting Dubai's vision to become the smartest and happiest city on earth, with mobility a cornerstone of achieving this. RTA adopted a four-step approach to drive an integrated mobility sector: firstly, to invest in infrastructure; secondly, to expand public transport; thirdly, to promote integrated services; and fourthly, to pioneer the future of mobility.

Invest in infrastructure:

To support Dubai's Masterplan 2020 and the aggressive targets for Expo 2020, RTA has recently redefined its infrastructural plan. Over \$7 billion was allocated to develop roadway projects that cater to growing inland urban clusters. One imperative was set: "smartization" of the infrastructure to enable integration.

Accordingly, RTA has launched its Intelligent Transport roadmap to drive smart initiatives over the next three years. The key components of this are smart lighting, smart parking, traffic info, collection and storage of data in one place. All initiatives were designed to allow the integration of the mobility components with other verticals in the city. This contributes towards achieving seamlessly integrated services in daily life, a key pillar of the Smart Dubai Strategy.

Expand public transport:

Dubai has set an objective that public transport should achieve a 20% share of journeys by 2020, up from 14% today. This translates into cutting congestion by 20% and reducing transport CO2 emissions by 30%.

More than \$2 billion was budgeted to expand public transport in Dubai over the next three years. Investments were underpinned by the addition of 15km of rail network (a 20% increase), over 1,000km of new bus routes (again, a 20% increase) and 20 new marine-transport routes. In addition, all metro, bus and marine stations are set to include customer-friendly services (such as wifi, display screens and air conditioning) to improve the waiting experience.

Promote integrated services:

RTA has set “integrated mobility” as a key topic for 2017. This represents a major step, so was only taken once the infrastructure and public transport system were well established. This will allow RTA to “smartize” Dubai’s mobility sector while promoting the use of public transportation, thus tackling challenges related to congestion and CO2 emissions – where conventional solutions have limited impact.

By the end of 2017, RTA will become the first transport player in the Middle East to develop an “integrated mobility platform” – a one-stop shop allowing customers to plan, book and pay for their trips via smart devices. Also, RTA is launching a “command and control center” to collect and store all mobility data (on passengers and traffic, for example) in one place. This opens the door for a multitude of future integrated services.

Pioneer the future of mobility:

Dubai is renowned as a leader in innovation, particularly around mobility. The city has set a target of 25% of vehicles being autonomous by 2030. Accordingly, RTA, with the support of private players, is working to establish a hub that focuses on R&D in the autonomous-vehicles space, as well as signing an agreement with Tesla.

Moreover, Dubai will be the first city to test innovative mobility modes (hyperloop, taxi-drones) to assess their viability for future deployment. A key aspect of this development is that all new/existing mobility modes work together, for streamlined integration. Dubai is aiming to develop the most innovative urban mobility system in the world.

Middle Eastern cities provide a favorable environment for this new mode for multiple reasons.

1. They do not have heavy legacy transport infrastructure to manage.
2. Infrastructure rollouts are faster and easier given the short decision-making process.
3. Most of these cities are undergoing ambitious transformation plans with the aim of increasing their attractiveness: an innovative urban transportation experience is seen as a strong lever for differentiation.

At this moment, we can see that the Ecosystem approach – usually implemented in a broader “smart-city context” – is a true game changer leading to progressive urban development opportunities.

The model opens the door to create true impact in a city:

- Push public transport modes via integrated offerings, hence reducing congestion and carbon emissions.
- Provide a seamless customer experience – search, book, pay – integrating mobility and other sectors.
- Promote complementarity between transport modes, rather than competition.
- Prepare the city to accommodate the future mobility modes.

What lessons can we learn from urban mobility in the Middle East?

Experience from older mobility systems in Europe, Asia and the US shows that in order to develop superior mobility systems, cities must be strong in four key dimensions: mobility strategy, mobility supply, mobility demand management (MDM) and mobility funding.

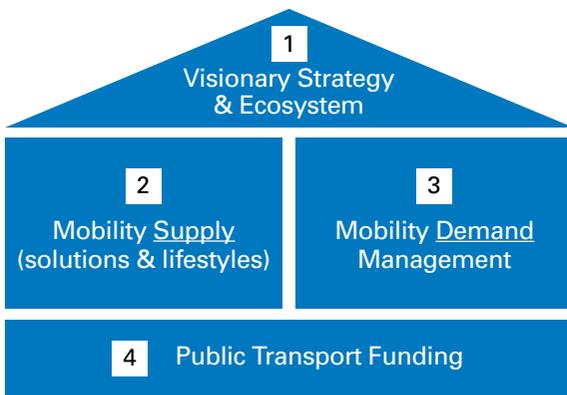


Figure 3: **System-level framework for sustainable mobility**

In the Middle East, financing and mobility supply are not issues in many major cities. New infrastructure, mobility solutions and integration initiatives are a role model for other regions. Besides that, cities such as Dubai have developed sound mobility strategies and will have funding for implementation through fast regulatory changes. What lessons can other cities draw from Dubai's move towards an integrated mobility ecosystem? We highlight the following key points:

1. Set solid foundations on the supply side: This includes infrastructure investments as well as investments in new mobility modes. On the infrastructure side, Dubai is a role model in rapid decision-making, planning and deployment of big infrastructure initiatives. The recently opened Dubai Water Canal, which runs through the heart of the city, took only three years to move from the start of the planning process to opening. Other examples are the metro, the tram and the ongoing renewal and modernization of streets, bus stops, and stations. The other aspect is investment in new mobility modes. Dubai is always striving to strengthen its position as an innovative, smart, forward-thinking pioneer.

For example, for Expo 2020, a huge fleet of autonomous-driving cars is planned to connect the Expo site to the city and other mobility infrastructure, such as airports and metro stations. A second recent example is taxi drones, which are intended to come into service in the current year, transporting passengers from skyscraper to skyscraper.

2. Set awareness for the necessary shift in mobility demand: Public transport's share of journeys is only 14.4% in Dubai, which is very low compared to other major cities in Asia, Europe and the US (where it reaches 35–55%). One explanation for this might be climate related, but the major reason is the mindset of users. Historically, individual transport was the only possibility users had. Dubai is now aiming to jump directly from an individual-centered mobility system to an integrated one, and launched several initiatives with the clear target to shift towards greater use of public transport. This is an ambitious plan; most citizens in Middle Eastern cities still consider the car a status symbol, and locals seldom use public transport. Bold initiatives will thus be required by Dubai's authority to turn this ambition into reality and ensure benefits from investments in new infrastructure, introduction of new mobility solutions, and ecosystem integration effectively, leading to improvements in mobility performance.

3. Think of mobility as an integrated ecosystem: The set-up and optimization of single mobility modes and infrastructure components (as described above) are important. Similarly to European and US cities (such as Vienna, Stockholm and Chicago) that pioneered the development of integrated mobility platforms, Dubai understood at an early stage that the entire mobility system could only be successful if single modes were networked and integrated in a system that solved a mobility "challenge" for the user: to go from A to B. A trip on the metro from station to station is worthless if the user does not know how to proceed from there, especially with a hot climate and (still) underdeveloped walking and cycling options. The solution is to integrate on the supply side as well as on the demand side – infrastructure and mobility modes have to be interlinked like a well-oiled machine in order to provide a seamless mobility experience. At the same time the offering has to be transparent to both tourists and locals. They all need a platform on which they can find information and book and pay for a trip from A to B, based on every available mobility offering. Arthur D. Little has designed integrated mobility platform (IMP) concepts in different parts of the world, including Germany, Austria and Dubai.

4. Be at the forefront of new mobility technologies: Dubai is continually searching for the latest new technologies. Innovation labs, international experts, panel discussions, fairs and visiting trips are all used to identify technologies that might move the mobility system forward. When potentially successful “pearls” are identified, decision-making and pilot programs are rapid. In this process, Dubai essentially works like a start-up company: if an opportunity is spotted, it is tested. Minimum viable product (MVP), pilot testing and phased implementation approaches are more valued than endless decision cycles. Another success factor is its participative approach – good ideas are listened to and respected.

Conclusion

The dramatic growth of urbanization is a global trend. It puts tremendous stress on one of the core functions of an urban area – the mobility system.

Traditionally, mobility systems have grown up through a “piecemeal” approach. The classical paradigm, a transition model, has gradually added to the supply side of transportation, while different modes were often developed in competition with each other.

Today this paradigm does not solve the key issues we are facing. The most effective way forward is an ecosystem approach. Mobility is addressed as a true holistic system in which all of the components work together. Leaders in applying this type of approach are fast-growing centers such as Dubai. Over the last 20 years, they have raced through the stages of urban development in record time, and are now going beyond the limits of the transition model and driving the creation of integrated mobility systems. Many of the bold initiatives launched by cities such as Dubai still need to materialize, and success often lies in successful implementation and public acceptance.

It will therefore be worthwhile for any and every urban developer, technology provider and traveler to study how this new ecosystem approach is being applied. When it comes to mobility, we may see learning becoming truly bidirectional. Middle Eastern centers have followed the traditional European and American development path for quite some time. Now they are setting their own priorities. Cities in other parts of the world should observe and potentially learn from their experiences.

Ralf Baron

is a Partner in Arthur D. Little's Frankfurt office and the Global Head of the Travel & Transportation Practice.

Thomas Kuruvilla

is the Managing Partner of Arthur D. Little Middle East and a member of the Strategy & Organization Practice

Morsi Berguiga

is an Associate Director in Arthur D. Little's Dubai office and a member of the Travel & Transportation Practice.

Michael Zintel

is a Principal in Arthur D. Little's Frankfurt office and a member of the Travel & Transportation Practice.

Joseph Salem

is a Manager in Arthur D. Little's Middle East office and a member of the Travel & Transportation Practice.

Mario Kerbage

is a Consultant in Arthur D. Little's Middle East office and a member of the Travel & Transportation Practice.