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Outsmarting the region's traffic troubles

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As Dubai has shown, smart transport infrastructure not only requires new laws, but also substantial technology investments

Dubai has been pioneering the adoption of smart transport solutions by offering services such as smartphone apps that enable live traffic feeds, and by carrying out pilot trials of autonomous vehicles (AVs), both on land and in the air.

The Roads & Transport Authority (RTA), the lead agency overseeing policy and projects related to transport, has also recently inaugurated the \$100m enterprise command and control centre (EC3) which integrates traffic management across all mass transport systems and has predictive traffic forecasting capabilities.

Other recent projects include “smartifying” traditional infrastructure such as roads by connecting a traffic lights to the EC3 to enable remote management.

Policy changes to accommodate data sharing between the public and private sector have also taken hold, with a view to more efficient public transport provision. Dubai has boldly asserted that it wants a quarter of all journeys in the emirate to be accounted for by AVs by 2030.

Region-wide changes

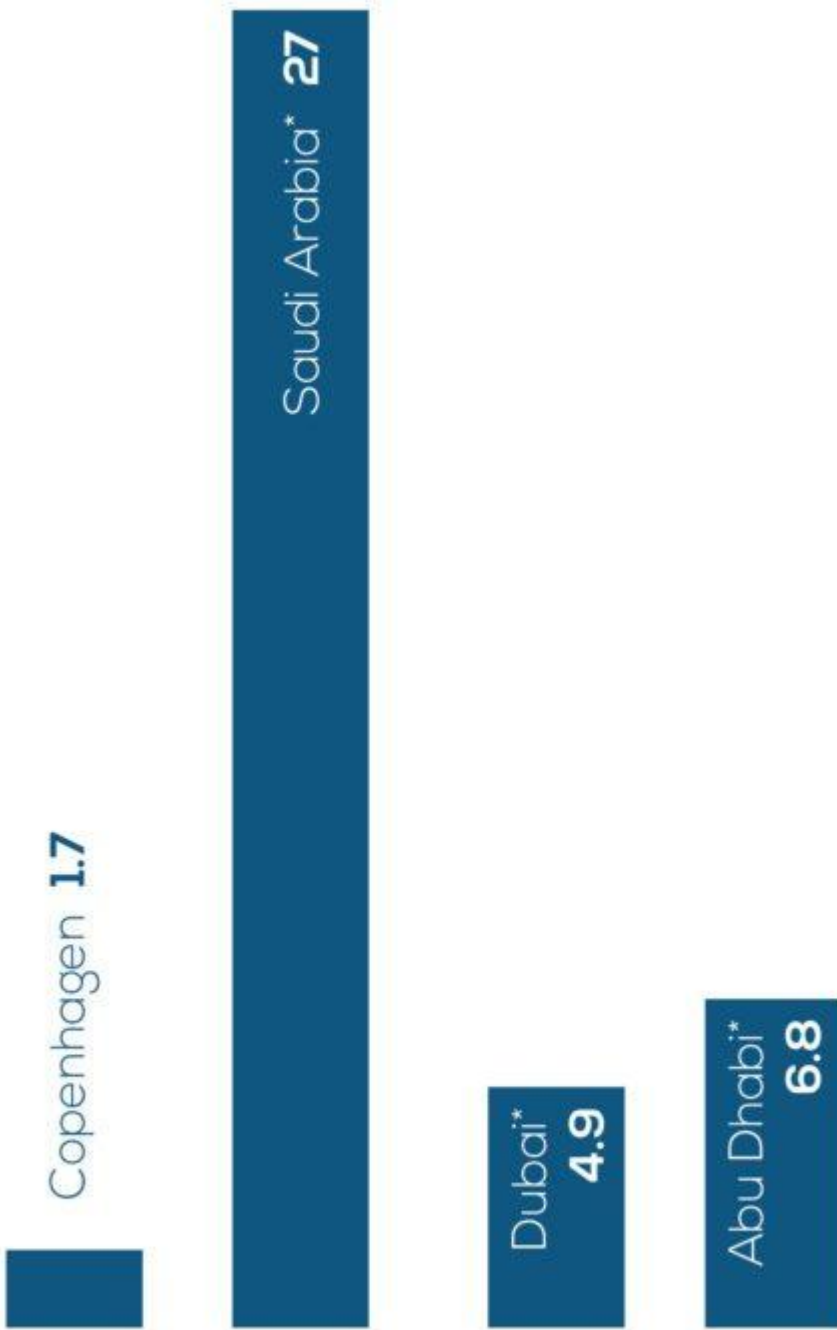
Providing efficient transport services enabled by new technologies such as Big Data and the Internet of Things is a stated priority for many cities in the Middle East that, like Dubai, have undergone rapid urbanisation. Factors underpinning this new direction include the desire to address traffic congestion, control carbon emission levels and improve road safety.

The region has high levels of car ownership, reaching in excess of 500 cars per 1,000 people in some urban areas. This, combined with intensive use of energy for industrial applications and building cooling systems, gives these cities the distinction of having some of the world’s highest carbon emissions per capita.

They also have the world’s most unsafe roads. Transport-related fatalities in some cities in the region are significantly higher than in several European cities, where mass public transport rail systems or non-motorised transport such as bicycles are commonly used.

**ANNUAL ROAD
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Per 100,000 population



**=Calculated based on figures released by transport agencies and calculated against official population figures. Sources: Transport agencies; news; MEED*

New thinking

The rapid pace of urbanisation in the region means governments must reconsider their old approach of addressing the challenge of congestion solely from the supply angle, through investments in traditional transport infrastructure such as roads, according to Arthur D Little, a US-based consultancy that has been working closely with the RTA.

More than \$265bn-worth of road projects, including tunnels, bridges and car parks, were awarded the Middle East and North Africa (Mena) region between 2003 and 2017, with the GCC states accounting for 76 per cent of the total, according to MEED Projects' data. A further \$172bn-worth roads are planned in the Mena region.

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Tackling congestion

Despite these investments, the growth in registered cars continues to outpace the growth of road networks. Road capacity in Dubai, for example, increased by 36 per cent between 2006 and 2014, and yet the number of Dubai-registered cars doubled during the period.

“When tackling congestion, it is tempting to focus on quick fixes and local solutions, such as building new roads or upgrading junctions,” says Joerg Tonndorf, Middle East associate director at Arup. “But it is important to understand the root causes of traffic demand and consider the use of alternative approaches, including policy and regulations, to influence travel behaviour.”

Supply and demand

Dubai's strategy to adopt a mobility ecosystem that considers both supply and demand is seen as an effective way to address congestion.

As RTA projects have demonstrated over the past few years, the city's model consists of investment in infrastructure and the expansion of public transport services, including the region's first driverless metro system and innovations such as autonomous vehicles.

Other measures that the region is being encouraged to adopt to improve urban mobility include charging real-time congestion fees, incentivising property developers to build bicycle lanes and pedestrian paths, and providing affordable and integrated public transport based on light rail and

bus systems, in addition to promoting car-sharing models such as Uber and Careem.

Transport authorities are advised to use digital technologies more comprehensively in order to increase passenger uptake of existing public transit systems.

Enabling environment

Addressing supply-side regulations must also become a priority to ensure public safety and promote private sector participation in the delivery, construction and maintenance of transport assets.

“The biggest challenges facing the AV market globally are the restrictions imposed by out-of-date legislation that has been based around traditional transport modes,” says Andrew Bevan, smart mobility director at Parsons Middle East & Africa. Again, the UAE is set to play a pioneering role, with a planned new law covering AVs.

However, implementing new policies takes time and bold decisions, particularly in a region where cities have been designed around car use rather than pedestrians. “It is not an easy solution to sell [to the country’s top decision-makers],” a government executive tells MEED. “We are so used to doing things the same way and we’ve been very good at doing them.”

Regional progress

Government policy-makers beyond Dubai are now starting to pay attention. Bahrain has rolled out the first phase of its public bus network, while Riyadh and Doha are due to deliver their bus networks and first driverless metros between 2019 and 2020.

As Bahrain’s Transport and Telecommunications Minister Kamal bin Ahmed Mohammed tells MEED, “We cannot continue building more roads ... we will just delay the problem and congestion will continue.”

High-tech solutions

As Dubai has shown, a smart transport infrastructure not only requires new laws, but also substantial technology investments. The annual global market for smart transport solutions, including traffic and parking management systems, sensors, security cameras network and asset

management systems, and databases, is expected to reach up to \$280bn annually by 2023-24.

Based on this forecast, MEED estimates the region will need to invest at least \$7.5bn annually by 2023 in hardware and software solutions. This excludes capital expenses required for infrastructure such as metros, trams, AV tracks and electric car chargers.



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Public-private partnership

Given the sustained low oil prices that have limited government spending, public-private partnerships and special-purpose vehicles are being seen as important delivery tools for these projects, not just to plug funding gaps, but also in order to share risks.

“These models have the advantage of reducing the required upfront capital and spread the cost over a longer period, with defined repayment terms,” says Bevan.

“If structured correctly, and with the right partners, technology obsolescence can be mitigated with system upgrade plans throughout the lifetime of the contract.”

Supporting investment

New technology consumption models such as cloud-based services can also help mitigate challenges related to capital expense, points out Steve Cockerell, industry marketing director for rail at UK-based Bentley Systems. He adds that outcomes-led organisations often find smart ways to support their investment decisions.

For megaprojects such as a metro, the use of land value capture is an emerging trend, whereby property developers and other beneficiaries of the infrastructure investment are asked to contribute to the costs of delivery, according to Julie Alexander, director for urban development and smart cities at Germany-based Siemens.

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Long-term benefits

In some cases, the technology companies themselves could step in to provide financing in addition to upskilling the government workforce to be able to manage the infrastructure, explains Alexander.

Yet one of the most significant drivers for adopting smart transport solutions remains the long-term cost savings they afford, estimated to fetch up to \$800bn annually, derived from reduced productivity loss, accidents and medical, insurance and fuel costs.

Taken from this vantage point, it is apparent that the investment they require is relatively insignificant.

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GETTING SMARTER

New transport technologies, and regulations enabling them, present a golden opportunity for the Middle East to adopt safer and cleaner options to address traffic and mobility issues



Sources: World Bank, EIA, WRI, MEED, MEED Projects

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