Tackling the growing issue of congestion in urban areas

An excerpt from “An ecosystem approach to reducing congestion”

The challenge of congestion is a perennial issue for cities in the United States and around the world, and one that is rapidly worsening. Economic expansion, increased urbanization, the rise of ride-hailing services and e-commerce, underinvestment in infrastructure and mixed results from various policies and programs are seen as the primary trends that have exacerbated urban congestion in recent years. A new study, “An ecosystem approach to reducing congestion” — produced by Strategy& and PwC’s strategy consulting business — provides analytical insights on the most relevant trends, innovations, and case studies for reducing congestion.

Steady increase in debilitating traffic congestion

After World War II, the United States experienced substantial economic and population growth — from 151 million people in 1950 to 326 million people in 2018. Suburbs were created, urban sprawl increased, and a car-oriented culture developed. The number of motor vehicles on the road increased, from 68 million in 1958 to more than 270 million in 2018. By the mid-1980s, 85 percent of commuters were driving or carpooling to work, a trend that has remained consistent for 40 years.

Congestion is the breakdown in traffic flow, reduction in speed, and increase in crowding that occurs when a road’s capacity is exceeded. Capacity is so consistently strained on America’s roads that congestion is a chronic problem throughout the country. In 2017, the average person spent 41 hours in congestion, an increase of 8 percent over 2010. This report focuses on the United States, but for nearly every country with large cities, including emerging economies, congestion represents a major social and economic cost.

Causes of congestion

PwC’s study identifies six main factors that are contributing to congestion:

1. **Economic expansion**
   - Economists have long understood the strong correlation between an economy’s performance and the overall vehicle miles traveled (VMT) in that region. VMT, which is also affected by gas prices, serves as a reasonable proxy for potential congestion. In the US, given expectations for GDP growth, the US Census Bureau data indicates there may be a 1 percent CAGR for VMTs through 2030 — a 14 percent gain, or a 300 billion mile increase.

2. **Demographic changes and urbanization**
   - The US population continues to grow and shift from rural to urban areas. From 2010 to 2030, the US population is expected to increase 15 percent, from 309 million to 355 million, and the percentage living in urban areas is expected to rise from 81 percent in 2010 to 89 percent by 2050. This could exacerbate an existing trend — a 160 percent gain in the US urban population since 1980 — that has significantly increased VMT in cities.
   - Meanwhile, motor vehicles remain the dominant transportation mode.

3. **Transportation disruption: TNC and ride hailing**
   - Ride-hailing has grown, substituting for mass transit, putting more cars on the street, and contributing to congestion at the curb. Transportation Network Companies (TNCs) have experienced explosive growth, from just a handful of trips in 2012 to about 2.6 billion trips in 2017. The VMT from these TNCs grew from 30 million in December 2013 to 500 million in December 2016, a compound annual growth rate (CAGR) of 150 percent.

4. **E-commerce and on-demand delivery**
   - Internet-based purchasing is on a rapid growth trajectory, rising in the US from 0.3 percent of retail spending in 1998 to 8.7 percent in 2014. Estimates suggest that this share could rise by as much as 1.2 percent a year through 2030. While it once seemed likely that on-demand delivery would prompt consumers to reduce trips to malls and retail stores, the expected drop in VMT never materialized due to the resulting increase in single-package deliveries (and smaller vehicle loads), failed deliveries which drive repeat visits, and the high return rate of e-commerce orders.

5. **Underinvestment in infrastructure**
   - A well run transportation network is critical to limiting congestion, but urbanization has overwhelmed the infrastructure of many cities. This has been particularly problematic in the US, where roads, bridges, and tunnels already suffer from lack of upgrades and maintenance. The American Society of Civil Engineers’ 2017 infrastructure report card graded US systems a D+ overall. A primary reason for this is the backlog of unmet capital investment needed for highways and bridges.

6. **Mixed effectiveness of policies and programs**
   - Cities have embraced a variety of mobility solutions, with mixed effectiveness. For example, high-occupancy vehicle (HOV) and bus-only lanes are supposed to justify their capital-project costs by discouraging the use of private vehicles for commuting, but they often don’t. Because of challenges with enforcement and other operational issues, these solutions tend to lead to more, not less, congestion.

- Other city parking policies, such as subsidized on-street parking that reinforces the behavior of circling, can also contribute to congestion.

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3, 4 Ibid
The seven archetypes of 21st-century cities: City layout and commuting patterns

Every city’s transportation needs are unique, shaped by its layout and past infrastructure investments. Most cities can be grouped into one of seven archetypes, falling into three broad categories, as the following exhibit outlines. These archetypes explain the flow of people and goods between the urban centers of activity where people work and congregate (downtowns) and the outlying areas where many people live (suburbs).

<table>
<thead>
<tr>
<th>Compact core &amp; non-grid layout</th>
<th>Urban and suburban community</th>
<th>Sprawling metropolis</th>
</tr>
</thead>
<tbody>
<tr>
<td>A high-population density core where bulk of mobility takes place; medieval origins; circular city layout; narrow streets conducive to walking</td>
<td>Rings of suburban establishments outside dense urban core with mobility taking place at all levels; primarily a grid layout</td>
<td>Relatively uniform population density across entire grid layout area with small hubs of increased activity; mobility takes place between high-activity areas</td>
</tr>
</tbody>
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Guiding principles to reducing congestion

We propose five guiding principles for developing congestion solutions:

- **Consider near/long-term supply & demand levers**
  A combination of policies is required to drive sustainable change to reduce traffic density. Near-term solutions (i.e. banning street parking), are often quicker and cheaper to implement than mass transit systems that require a significant investment over a long period of time, but there are tradeoffs for each. Similarly, these solutions must address both demand (needs people have for transportation) and supply (facilities and infrastructure available to offer).

- **Design efforts to match your city archetype**
  Cities can learn the most from peers with similar history, built environment, and transportation infrastructure usage patterns. Cities tend to fit one of seven overarching models: Multi-Modal Core, Walking Core, Urban Hub Community, Mixed Hub Community, Suburban Hub Community, Driving Metropolis, or Efficient Metropolis.

- **Develop an innovative financing plan**
  Many options for fighting congestion are expensive, especially those that involve construction of new roads or bridges or expansion of public transit networks. If federal and state government support is elusive, cities should think regionally. For example, if suburban commuters account for a large share of demand, cities could seek suburban sources of funding. Technology companies and investors sometimes fund cutting-edge infrastructure projects to boost their brand. In the San Francisco Bay area, voters in nine counties approved a measure in June 2018 to raise bridge tolls by $3 over a period of seven years. Some 62 percent of the $4.45 billion of additional revenue raised over a 25-year period will go to transit projects. Public–private partnerships (P3s) can also help attract multiple participants and reduce the cost of new programs.

- **Take an ecosystem view to drive city livability**
  When planning is conducted for all aspects of transportation at once, multiple forms of leverage can be implemented — public transit, private vehicles, and parking — and reduce the tradeoffs among them. This ecosystem view should include an interplay of multi-modal transport options and different modes of travel designed to work together.

- **Foster innovation through collaboration, pilots, and agile policymaking**
  Innovation in the transportation space is evolving at a rapid pace. The effects of new technologies and transit are unproven and often unknown. When cities experiment through pilot projects, it allows them to learn from these trial experiments without having to jump into a full commitment headfirst. Once the value of an approach is seen, it can then be scaled through the broader municipality.

Conclusion

The trends that exacerbate congestion show no signs of weakening, and most cities have not yet fully articulated the steps they’ll need to take to improve. Nonetheless, plenty of tools are available that can help reduce congestion, and numerous forward thinking cities are implementing them in the United States and around the world. A proactive approach to congestion can be taken by shifting the trajectory of mobility and making cities far more livable, with convenient, clean, and cost-effective mobility solutions. Ill-considered and reactive choices that don’t consider the entire transportation ecosystem, including parking, are likely to exacerbate congestion. Public–private collaboration — with a focus on citizen-centered mobility — is an ecosystem-oriented approach that can lead us to a future where we want to live.

For more information, contact:

Brandon Mason
Director, US Mobility Leader, PwC
brandon.w.mason@pwc.com; +1 (313) 394 6098

Andrew Higashi
Director, Advisory, PwC
andrew.higashi@pwc.com; +1 (808) 772 0133