WHITE PAPER

Elegant Density

THE RACE TO ATTRACT URBAN DWELLERS

GLOBAL TRAFFIC TECHNOLOGIES

About This White Paper

EMERGING CHALLENGES FOR TRANSIT PROFESSIONALS IN URBAN AREAS

Cities across the United States — and around the world — are racing to build living spaces and infrastructures to capitalize on an unprecedented wave of urbanization.

Statistically, the number of megacities (populations greater than 10M) grew from two in 1970 to ten in 1990, then more than doubled to 23 in 2010. That number will surge to 37 by 2025. These cities already drive more than 60% of the world's GDP, so the economic implications of winning or losing the race are significant.

Anecdotally, young professionals prefer to spend disposable income on mobile devices rather than cars. They choose lofts and dense urban areas over suburbs with large lawns. They'd rather rent than own and they no longer view homes as great long-term investments. They can work just about anywhere — they don't have to live in the same city as their employers. In fact, 64% of them choose where they want to live before beginning their job search.

The choice of where to live is based on a handful of criteria, which invariably includes proximity to commercial, social and entertainment hubs. Young professionals want to live where they can walk to their destinations. Or, bike safely. Or, ride quality public transportation. For many, automobiles are considered superfluous.

For city planners and transit officials, the challenge isn't how to simply survive the flood of people moving to urban areas. The real question is how to capitalize on this incredible sweeping change. For many transit professionals, the quest to achieve elegant urban density becomes a career-defining challenge that adds new strategic dimensions to daily decisions.

CONTENTS

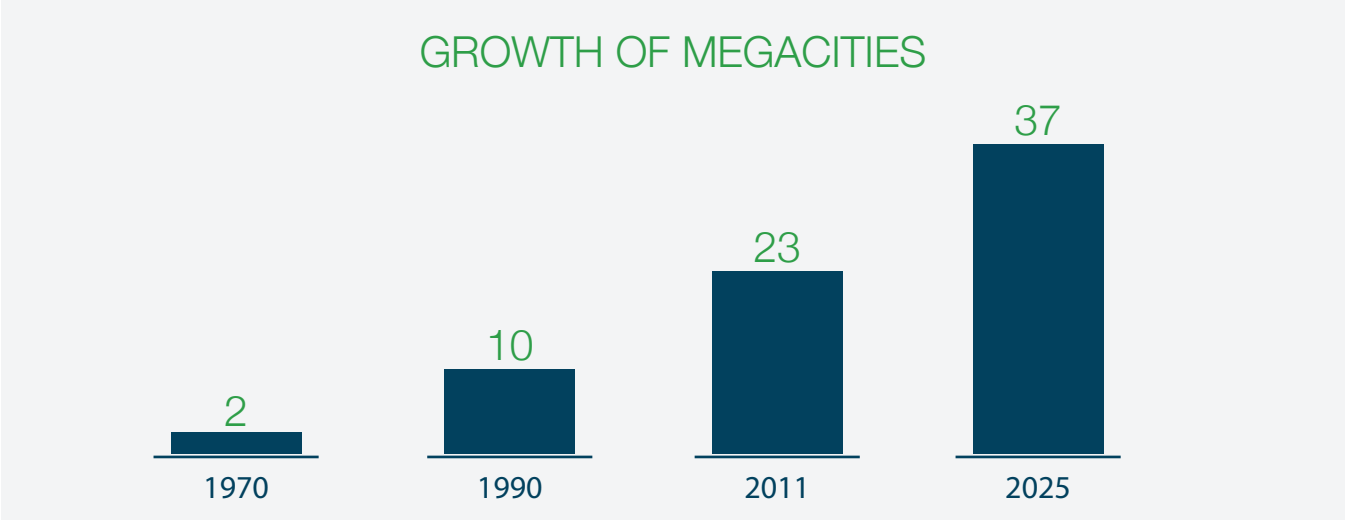
Understanding Urbanization

Pick up any large metro newspaper and there's a good chance you'll find an article about millennials (people born between 1980 and 2000) eschewing the suburban lifestyle and moving into downtown areas or other dense neighborhoods. Those same stories talk about cities creating green spaces, expanding public transportation and facilitating the construction of lofts, condos and apartments — all in order to attract a generation of people who prefer the urban lifestyle.

While there has been debate as to whether millennials in the U.S. have really turned away from the dream of a suburban home with a large backyard and an SUV in the driveway, statistics from every country in the world paint a clear picture — urbanization is a mega-force that is shaping political, cultural and financial realities on every continent.

The evidence supporting the rapid rise of dense urban areas is overwhelming. In 1970, there were two megacities in the world — which are defined as cities with populations exceeding 10 million. By 1990, the number of megacities grew to ten. The number of megacities more than doubled by 2011, when it climbed to 23. And it's growing at an even faster pace now. Population experts predict there will be 37 megacities by 2025.

In the year 1800, only three percent of the world's population lived in urban areas. By 2005, more than 50% of the world's inhabitants lived in large cities. In fact, there are about 37,000 cities worldwide, yet more than 20% of the world's population resides in only 600 of them. On an economic note, a 2011 study by McKinsey & Company concluded that urban dwellers in those cities accounted for more than 60% of the world's GDP.



The accompanying density is astonishing. According to the U.N. Department of Economic and Social Affairs, Dhaka, Bangladesh (with a population of 14.4 million) supports 115,200 people per square mile and Mumbai, India (population 17.7 million) supports 82,000 people per square mile. In the United States, Los Angeles (7,000 people per square mile), San Francisco (6,266 per square mile) and New York (5,319 per square mile) are currently the densest urban areas.

From a transit perspective, this creates problems and opportunities. Clearly, if the people flocking to dense urban areas all brought their own vehicles with them, even the most well-designed roads would be overwhelmed. But for both public and transit organizations, urbanization brings loads of customers who are likely to make buses, subways and light rail core parts of their lives.

A 2013 study conducted by the American Public Transportation Association asked millennials about their preferred modes of transportation. While driving a car still leads the list, walking, subway, light rail, bus and bicycle (in that order) were all tightly grouped. More than previous generations, the study found millennials viewed car ownership and use as "expensive." While buses, subways and light rail pose personal space issues, millennials tend to prefer them because they're more affordable than cars (pay-per-use). Plus millennials are more environmentally responsible and they can read, work or use social media while in transit.

PUBLIC TRANSPORTATION — THE RIGHT CHOICE

865 MILLION
HOURS IN TRAVEL TIME
SAVED ANNUALLY

450 MILLION
GALLONS OF FUEL
SAVED ANNUALLY

37 MILLION
METRIC TONS OF CO_2 NOT
RELEASED EVERY YEAR

$21 BILLION
SAVED ANNUALLY BECAUSE
OF PUBLIC TRANSPORTATION

Profile of Urban Dwellers

UNDERSTANDING THE MILLENNIAL MINDSET

For more than three decades, baby boomers defined life in the United States. They wanted large homes, big backyards and suburban living spaces where the mall serves as the primary social and economic center. They could afford more amenities the further they moved from the city's epicenter. The longer commute to work or trek to the city was merely considered a necessary blip on the otherwise seemingly idyllic life in the suburbs.

Boomers grew accustomed to the sprawl, as well as the costs to maintain it. The number of roads nearly doubled. But as we cycled through various economic downturns, it became obvious that our dependence on the automobile was untenable. In the 1970s, about 10% of a family's income was used for automobiles. That number has ballooned to about 20%. In fact, working-class families (median income of about $50k annually) spend more on driving than housing. It's no surprise then, that the next generation has developed a very different view on life.

The 76 million boomers who flocked to the suburbs in droves raised more than 80 million millennials. Millennials are the best-educated generation in history. Along with their education, however, they accumulated staggering amounts of debt. They also observed — and to some degree weathered — the economic downturn that started in 2008, which wreaked havoc on 401Ks, the U.S. housing market and other seemingly safe investments. All of this has contributed to a profound cultural shift. As a group, millennials do not want to add more debt in the way of large mortgages and car loans.

Often, the shift begins in college where many millennials embrace a more urban lifestyle. They walked, biked or used public transportation. They may not have had a car to drive to buy groceries or go to a movie. Friends and preferred social venues were in the same urban space. They realized this lifestyle didn't exist in the suburbs where they were raised. Multiple studies show they crave the diversity, proximity, vitality and excitement of urban areas.

As a result, millennials purchase fewer cars, they drive less and they consciously spend money on things other than loans, insurance and maintenance associated with automobiles. In fact, since 2001, the number of miles driven by 16-34 year-olds has declined an amazing 23 percent. And, the percentage of drivers under the age of 25 is lower than it's been in more than 50 years.

MAKING CITIES MORE ACCESSIBLE, MORE LIVEABLE

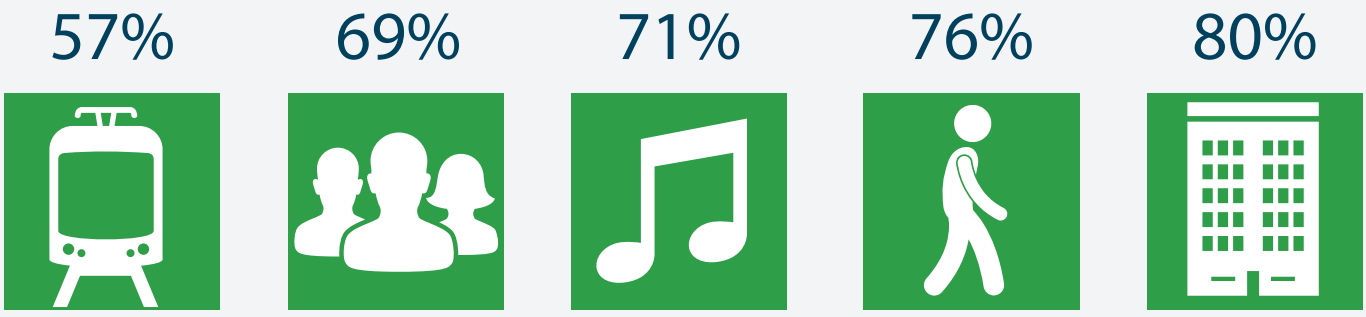
Millennials live, work and play much differently than their boomer parents (who are also beginning to sell their homes and move into urban areas for reasons of their own). They choose where they live for very different reasons. They want to live near work, close to friends and within walking distance to stores, restaurants and bus and train lines. In fact, a 2013 study by the Land Use Institute shows millennials value (a) a short distance to work and school, 82%; (b) walkability, 76%; (c) distance to family and friends, 69%; (d) distance to shopping and entertainment, 71%; and (e) convenient access to public transportation, 57%.

It's no surprise then, that Portland, OR has experienced incredible population gains among college-educated millennials in the past decade. It is ranked annually among the country's most "walkable" and bicyclist friendly cities. Portlanders spend less of their incomes on driving than almost any other U.S. city. They also drive 20% less than the average American driver. How did Portland curb its reliance on driving?

When other municipalities were investing in roads, Portland visionaries invested in bicycling and walking paths — and strategies to integrate all forms of transportation seamlessly. Since 1980, the city has spent about $60M on bicycling paths and lanes. While that may seem like a hefty expense, consider, the city doubled that expenditure on the development of a single highway cloverleaf. The cloverleaf only serves drivers. The walking and biking paths are integrated with roads, so that every member of the community can walk, pedal a bike, drive a car or ride transit to reach their destination.

MILLENNIALS AND LIVEABILITY

A 2013 study asked millenials what factors are important to them when choosing where to live.



Capitalizing on Urbanization

POTENTIAL SUCCESS FACTORS FOR TRANSIT ORGANIZATIONS

While trends point to continued urbanization and less driving, millennials and other urban dwellers will likely never completely abandon automobiles. The flexibility and private space they offer will always make them part of the mix for urban dwellers.

Clearly, people living in dense urban areas are rapidly becoming multi-modal. They're willing to walk or use public transportation when they can and they will drive a car when necessary or convenient. Cost, simplicity, congestion and environmental responsibility, however, will make public transportation central to their lives.

How much they use it and what they are willing to pay for it will vary greatly from market to market and depend heavily on how transit organizations design, implement, manage and optimize their systems.

IDEAS FOR OPTIMIZING PUBLIC TRANSPORTATION

Leverage Transit Technology

Public transportation in Hong Kong, Bogota and Sao Paolo use bus rapid transit (BRT) systems to accommodate and encourage immense ridership numbers. BRT systems offer faster speeds, fewer stops and dedicated right-of-way that are afforded most rail systems, but on an existing street grid to reduce capital costs by up to 300%. As a result, more passengers can be transported to their destinations faster and with fewer risks. In fact, Bogota's TransMilenio BRT has a passenger demand of 1.98M per day, carrying up to 90,000 passengers in a single hour.

Creating the infrastructure for more efficient transit is only the beginning. Cities have to deploy technologies to ensure buses and light rail run predictably with less costs. Transit signal priority (TSP) allows them to extend or truncate traffic signals and stay on schedule with more consistency. The ability to keep moving also improves rider satisfaction, cuts fuel costs, reduces emissions and potentially allows transit organizations to meet demand with fewer buses and trains.

The U.S. Department of Transportation recently enacted the Moving Ahead for Progress in the 21st Century Act (MAP-21) to strengthen the country's transportation system while simultaneously driving the economy. The bill provides more than $105B for funding and transforming surface transportation programs in 2013 and 2014. In addition, it states that every BRT project funded through the MAP-21 federal transportation bill must include TSP.

Digital Connectivity

Multiple reports, including the 2013 study conducted by the APTA, indicate that millennials (and other age groups) like public transportation because they can connect to email, social media and other elements of their digital worlds while riding on it. Ensuring connectivity — WiFi, 4G or whatever network technology is prevalent at the time — will likely increase ridership and increase perceived value.

Digital Schedules & Mobile Payment

Millennials have their entire lives on mobile devices. They can access information about work, school, banking, loyalty programs, restaurants, sporting events and school information anytime, anywhere. They don't like paper or hard-to-use apps and websites. Offering digital tools that make it easy to plan trips, adjust travel plans and pay fares will allow public transportation to become more core to their lives.

Trip planning tools

Technology can impact the methods people use to move around cities. Traffic engineers can leverage real-time traffic data to make more informed decisions to alleviate congestion or manipulate faster-moving traffic flow. For example, non-invasive monitoring technology can be deployed beneath city streets to detect the amount, speed and types of vehicles traveling on city streets at any given time. This information can lead to more efficient transit routing and traffic signal management, which encourages higher ridership numbers for urban dwellers.

Additionally, when cities can improve traffic flow for vehicles, they enhance the mobility for pedestrians and bicyclists sharing the road with them. Between 2000 and 2011, bicycle commuting grew 47% nationwide. In Portland, it increased 250% during the same time period. By knowing the types of vehicles on the road at any given time, cities can develop strategies to integrate bike lanes with minimal disruptions to vehicular traffic — and minimal risk to bicyclists.

Become a connected advisor

The lines separating our work and social lives are blurring, largely because the mobile devices we carry allow us to move freely between both worlds. Millennials in particular are open to mobile commerce concepts, such as co-marketing, geo-marketing, gamification, peer reviews and mobile commerce. Tapping into this world will likely increase ridership and perceived value. For example, providing information about events and venues or creating joint marketing programs with restaurants and retailers along routes would likely be valuable to riders.

Minimize costs

It's clear that millennials weigh a number of factors when choosing their mode of transportation — convenience, enjoyment, environmental responsibility and costs top the list. The most effective way for transit organizations to keep prices low and attract more riders is to minimize operating costs.

Technologies such as transit signal priority (TSP) contribute directly to lower fuel and maintenance costs. They can also potentially reduce the number of buses or trains in a fleet, which can measurably reduce capital maintenance and fuel costs.

Some TSP deployments offer great short-term and sustained cost reductions. Cities should seek flexible TSP systems that can scale up quickly to accommodate increases in demand. The best systems offer scalability and expansion without the need to disrupt service or re-invest in an entirely new system.

GPS technology also offers significant cost control benefits. For example, with GPS-enabled TSP systems, engineers can troubleshoot equipment at intersections remotely, without sending technicians into the field.

Many large cities already have IR-based TSP systems deployed. They can incrementally upgrade to GPS technologies without compromising existing IR-based system performance. This is typically accomplished with multimode systems that offer interoperability between technologies — sometimes even with neighboring municipalities.

About Global Traffic Technologies

Global Traffic Technologies, LLC (GTT) works closely with city leaders, transit organizations and emergency responders around the world to solve critical traffic challenges. The company designs and manufactures Opticom™ priority control solutions, the best-selling brand of traffic signal priority systems in the world. We also offer Canoga™ traffic sensing systems, which provide transit professionals with real-time traffic data — such as traffic counts, speeds and even types of vehicles — so they can make more informed decisions regarding traffic flow.

GTT traffic technology experts collaborate with its customers to solve problems and capitalize on emerging opportunities to improve safety, enhance citizen service levels and improve financial outcomes. We often work as an extension of our customer's staff to ensure our solutions meet or exceed expectations. GTT solutions are deployed in more than 70,000 intersections and more than 2,800 cities worldwide.

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