The Globalization of Traffic Congestion:

IBM 2010 Commuter Pain Survey

IBM

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Forward

Traffic. It is maddening. It is protracted. It is engulfing. It is increasingly harmful – by every conceivable measure – to individuals and businesses alike. Unfortunately environmental concerns, rising gas prices, and an economic slowdown have done little to weaken the chokehold of traffic on the life of cities.

IBM conducted a survey of adult drivers in twenty major cities around the world – repeating similar surveys done in the U.S. alone in May 2008 and August 2009. This survey, intended to gather drivers' opinions about local traffic and related issues, was conducted in native languages in Amsterdam, Beijing, Berlin, Buenos Aires, Houston, Johannesburg, Los Angeles, London, Madrid, Melbourne, Mexico City, Milan, Moscow, Montreal, New Delhi, New York, Paris, Sao Paulo, Stockholm and Toronto. There were 8,192 responses in the final data set – at least 400 from each city. IBM was not mentioned as a sponsor of the survey, whose results have a 2-point margin of error overall, and a 5-point margin of error when comparing cities.

Among those interviewed 30% of respondents reported increased stress from traffic; 27% increased anger; 29% reported that traffic has harmed their performance in work or school; and 38% reported having cancelled a planned trip due to anticipated traffic. We know the enormity of this problem – both in its objective and subjective dimensions. Traffic congestion does not just add stress to our already-stressful lives; it impedes economic development while increasing air pollution.

The question now is: what is to be done? More fuel efficient cars, more public transportation, more ridesharing, more telecommuting are all good steps – but hardly enough. And it is clear that the traditional remedies for road congestion – adding a lane or building a new road – have proven to be just a temporary fix before congestion returns. Technology can help. For the first time in history, digital and physical infrastructures are converging. As a result, we are now able to understand large, complex systems that previously resisted investigation – systems as diverse as waterways, oilfields, and transportation networks.

Transportation officials are now able to collect real time data on traffic conditions and instantaneously analyze that data and deploy strategies that minimize delays and congestion. Thanks to the proliferation of data-gathering devices on our roads and recent advances in business analytics – large volumes of data can be quickly synthesized and actionable insights extracted that allow for active management of our transportation networks to keep people moving more efficiently.

We hope that this report will stimulate debate, thinking, and ultimately solutions to this most perplexing and painful problem: traffic. Lastly, thanks again to the 8,192 commuters who troubled to share their woes!

"If all the cars in the United States were placed end to end, it would probably be Labor Day Weekend."
- Doug Larson

"Life is too short for traffic."
- Dan Bellack

The nature of the commute

Although driving is by far the main way in which Americans go to and from work, this is distinctly contrary to other parts of the world. For instance, while over 90% of the respondents in New York and Los Angeles reported driving to work, only 32% did in Paris, 34% in Amsterdam and Buenos Aires, and 37% in Milan. The worldwide average in this study is 56%, although all Latin American and Asian cities surveyed were below 50%. The only cities outside of the U.S. with comparatively high driving levels were Stockholm (64%), Toronto (70%), Johannesburg (81%), and Melbourne (91%).

After driving, the most popular form of transportation was bus – at 12%. Interestingly, the two cities with the most painful commutes, according to the survey – Beijing and Mexico City – had bus rates of 44% and 32%, respectively – raising the thought of how much worse traffic would have been if so many people did not travel by bus.

For trips other than to work or school, the profile was quite similar, with the exception that carpooling edged out the bus as the second most popular mode of transportation. Here Madrid led the way with 29%, followed by Stockholm and Mexico City at 20%, and Sao Paolo and Milan at 18%.

As for the type of roads on which commuters drive, the only noticeable pattern was that driving on downtown city streets was far more prevalent in Beijing (91%), Moscow (88%), Berlin (83%), New Delhi (80%), Mexico City (78%), and Sao Paolo (76%) than in the other cities. With the exception of Berlin, all of these cities have the most painful commutes.

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The typical one-way length of commuting in these cities is 13 miles, or 32 minutes (average driving speed of 24.4 miles per hour). The variation among average distances was no more than 4 miles for these cities, but the times ranged from a low of 27 minutes in New York, Los Angeles, and Melbourne, to a high of 40-42 minutes in Mexico City, New Delhi, Beijing, and Moscow.

As for the time of day that commuters did most of their traveling, no patterns truly stood out. But when people tended to arrive at work or school later they tended to stay later.

Perceptions and other aspects of the commute

When it comes to pain, perception is reality, and the commuters in this survey clearly felt that roadway traffic has become worse in the last three years. 49% percent said it had become worse and 18% said it had become a lot worse. Conversely, only 20% of those surveyed said the situation had improved at all and only 5% said it had improved substantially. Interestingly, in the category of substantial improvement, New Delhi and Beijing led the way at 17% and 16%. This can be attributed to new transportation capacity being aggressively added in both these cities. The cities where respondents were most likely to say that the traffic situation had worsened somewhat or a lot were Johannesburg (80%), Moscow and Toronto (64%), Mexico City (62%), Sao Paolo (61%), Milan (59%), and Buenos Aires (57%).

The perception of worsening traffic stemmed in large part from having been stuck in traffic for significant lengths of time. The average delay was one hour – very similar to the figure for the U.S. alone in the previous two Commuter Pain surveys conducted by IBM. The "best" cities in this regard were Melbourne, Stockholm, and Buenos Aires, where a quarter or more of the respondents said they had never been stuck at all. The longest delays by far, were in Moscow, where the average reported delay was a whopping 2.5 hours and where more than 40% of the respondents said they had been stuck in traffic for over 3 hours.

Gas prices, notably in flux in recent years, appear to have a potential bearing on the willingness of commuters to drive to work. About a quarter of the respondents said that gas prices would have to rise by 20-30% for them to seriously consider other forms of transportation. A large proportion of the respondents (47%) thought that gas prices are already too high. Cities in which this feeling was particularly acute were Amsterdam and Madrid (66%) and Buenos Aires (64%). Cities in which it was relatively absent were New

Delhi (24%), Moscow (31%), Los Angeles (36%), and Houston (39%) – perhaps suggesting that at least a modest rise in gas prices would not much affect traffic in those cities.

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Regarding the necessity of working in the office as opposed to home and the effect of the economic downturn on the way people go to work, the findings were in some ways surprising. For instance, Moscow, New Delhi, and Sao Paolo – again, ranked among the most painful commutes – all recorded significant numbers of people who worked at home 2-5 days per week. As for the effect of the economic downturn, 23% said it made them change their transportation ways; 77% said it did not. The greatest percentage saying it did change their ways were in Mexico City (60%), New Delhi (50%), and Buenos Aires (41%) – suggesting that traffic alone, though bad, was not enough to make them switch their transportation modes.

Drivers also reported on the most frustrating aspects of their commute. Forty-three percent said it was the stop-start traffic; 32%, the rudeness and aggressiveness of drivers; and 26%, the unreliable journey time. The stop-start traffic was particularly pronounced in Johannesburg and New Delhi (66%), Mexico City (63%), Beijing (55%), and Madrid (53%). Further, the unreliable driving time was significantly more the case in Moscow (57%) and Beijing (49%) than in other cities. An interesting feature of this set of findings was that low speed was less of a frustration than was stop-start traffic.

When commuters cancelled a recent planned driving trip, the destination was work 24% of the time, recreation 22%, and shopping 21%. The work-related cancellations were most pronounced in Buenos Aires (43%), Mexico City (42%), Stockholm (36%), and Milan and Moscow (35%). The only surprise here was perhaps Stockholm, which, again, ranked best on our overall index.

The consequences of traffic

As for a reduction in travel stress, 36% of the respondents said that improved public transportation would help. Beijing topped the list here (65%), followed by Milan (57%), New Delhi (53%), Sao Paolo (52%), and Paris (51%). Only 17% of respondents said they did not experience traffic stress. Leading the way here was New York City (34%), trailed by Houston and Melbourne (33%), Toronto (32%), and Stockholm (30%). These are all cities with well-developed public transportation systems.

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When asked whether traffic had harmed their health in any way, 57% said yes. Among those who said it had, increased stress (30%) and anger (27%) were the primary manifestations. Increased stress was most prominent in Mexico City (56%), Sao Paolo (55%), New Delhi (45%), Buenos Aires (44%), and Beijing (40%), while anger prevailed in Beijing (53%), Moscow (51%), New Delhi (48%), and Mexico City (43%). All of these cities were among those identified in the survey as having especially painful commutes.

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Has traffic ever been so bad in the last three years as to alter the traveling plans of commuters? Overall, 31% of the respondents said yes, 69% in Beijing said yes, followed by 58% in New Delhi, 50% in Mexico City, and 45% in Sao Paulo. Similarly, when asked whether in the last month they had cancelled a driving trip due to anticipated traffic, 38% overall said yes. But 69% said yes in Moscow and Beijing, 62% in Mexico City, 59% in New Delhi, and 57% percent in Johannesburg.

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Conclusion

Traffic, as this report largely shows, is a major and debilitating problem. We have no reason to believe that in the near future the number of cars on the road will decrease or that road improvement projects will significantly enhance the daily commute. Therefore, other steps are required.

We need to understand that traffic is not just a line of cars: It is a web of connections. A real solution will look at relationships across the entire road network and all the other systems that are touched by it: our supply chains, our environment, our companies, the way people and communities live and work.

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Fortunately, today's technology can give us that kind of insight. Systems can provide transportation officials with detailed, real-time traffic information; sophisticated analytics of that information that can predict traffic jams; and thus planners can use the resulting insights to proactively deploy traffic management strategies that would minimize delays and congestion. Some examples of interventions include changes to signal timings, dynamic toll adjustments, incentives to change mode of travel, incentives for changing time of travel, etc. Such intervention can result in smoother traffic flow, reduced emissions and reduced delays.

Around the world, governments are relying on this kind of technology, in addition to traditional methods, to make big improvements in their transportation networks. For example, in Singapore, controllers receive real-time data through sensors to model and predict future traffic flows with 90% accuracy.

Finally, we have to realize that this is not the problem of business, government, or commuters alone. It is a problem for all of us; and we must all work together to solve it. It is IBM's hope that this report – together with the conversations we hope it generates – will contribute to that solution

