



Frustration Rising: IBM 2011 Commuter Pain Survey

September 8, 2011

Foreword

Anyone who has driven through a major city has experienced – to put it politely – the frustration of traffic. The consequences of this traffic are obvious and debilitating. They include stress and anger; the greater consumption of gas; the choking of our air from pollution; the loss of leisure and work time; and countless other ill effects. The human and economic costs of this scourge are vast, and ever-increasing.

This report, the fourth annual one that IBM has produced, attempts to gauge drivers' perception of how traffic affects them based on factors such as stress, anger, health, and performance at work or school. More than 8,000 drivers (approximately 400 per city), from 20 cities around the world, were surveyed in their native languages, without identifying IBM as the survey's sponsor. The following 20 cities were picked for the survey from among the world's top 65, in terms of size and economic activity: Bangalore, Beijing, Buenos Aires, Chicago, Johannesburg, London, Los Angeles, Madrid, Mexico City, Milan, Montreal, Moscow, Nairobi, New Delhi, New York City, Paris, Shenzhen, Singapore, Stockholm, and Toronto.

The result? A portrait in human pain. Also, a clear outcome: Mexico City showed up as the 'most painful' city for commuting, while Montreal, London, and Chicago came out the 'best' – though as this survey shows, 'best' is highly relative to the cities we studied. Furthermore, a phenomenon we will investigate in a follow-up paper, while the commute has in fact become more significantly more bearable in the past year, perceptions of pain have rather increased.

Regardless, the overall traffic picture is sobering. Consider some of the extremes: In Nairobi, 35% of drivers reported that they have spent three hours or more in traffic, and in Moscow, over 45%. In Beijing and Shenzhen, anger from traffic is by far the highest among the cities surveyed, while in New Delhi, Shenzhen and Beijing, huge numbers of drivers have simply turned around and gone home rather dealing with the frustration of their intended journey. The fashion capital of Europe, Milan, also leads the way in stress from driving, followed closely by Mexico City – which ranked number one overall – when it came to people specifically avoiding trips altogether due to traffic.

These are just a few highlights of a global traffic calamity – even in the European and North American cities, which fared relatively well in our survey. The question, of course, is: what can be done to alleviate this state of affairs?

Unfortunately, the most obvious answers – like building new roads or widening existing ones – are often not practical, given economic and space constraints. And even if we could take these steps, given the increasing number of vehicles on the road they would be unlikely to fix the problem for long, if at all.

Our best hope lies in making the most of the roads we have – primarily through the use of technology to improve their performance and efficiency. Stockholm, the city that by a number of measures came out the best in this survey, has instituted a congestion charging system. Just a month after the system began operating, morning commute time was down by an average of 50%. Cities are using myriad sensors – embedded in roadways or in taxis and buses – to gather more information about traffic and, through capabilities like analytics, a combination of ad-

vanced mathematics and massive computing power, are growing their capacity to predict and avoid congestion.

We believe that, like its predecessors, this report will provoke thought and, in the end, yield better solutions to the nightmare of traffic. Here, we take a moment to thank the 8,000 commuters who shared their views with us. We owe it to them – and billions more – to tackle this problem.

Particulars of the commute

Here, across all cities, we look in detail at three aspects of the commute: its nature, perceptions about it, and its consequences.

The nature of the commute

Across cities, *driving* is the predominant way to get to work or school (55% drive a car, 5% a motorbike, and 5% carpool on a worldwide average), with *public transportation* ranking a distant second (13% use the bus, 7% a train).

When looking across cities, however, some interesting differences emerge. While, for instance, more than 70% of respondents in Los Angeles, Nairobi, and Johannesburg drive a car *by themselves* to reach their destination, we see that in a number of cities public transportation is a sizeable alternative. In Buenos Aires, Mexico City, Madrid, Beijing, Shenzhen, and Nairobi, a significantly higher proportion of respondents used buses. In London, Madrid, Paris, New York City, Buenos Aires, and Singapore, by contrast, a relatively higher proportion of respondents resorted to the train. Bangalore seems to be the city of motor bikers, while Paris, by a wide margin, used driving the least – indeed, 15% apiece used buses and trains, and 11% walked (far more than in any other city). In Nairobi, a shared taxi, or ‘matutu,’ was popular. The obvious implications here are that public transportation, walking, and driving are effective in reducing traffic.

For all of the cities, the average one-way length of the commute is 12.8 miles, taking about 33 minutes – meaning they are travelling a little over 23 miles per

For all of the cities, the average one-way length of the commute is 12.8 miles, taking about 33 minutes – meaning they are travelling a little over 23 miles per hour, a pace most would probably consider frustratingly ‘leisurely.’ American respondents (New York City, Chicago, and Los Angeles), as well as inhabitants of Johannesburg, have the most miles to go (15+), while those in Mexico City, Moscow, Bangalore, Beijing, and Africa (Nairobi and Johannesburg) spend the most time (close to 40 minutes, on average) on the road to get to their workplace or school. So clearly, the physical length of the trip is not the primary determinant of its time. It is, instead, traffic. Most of us can recall a nightmare commute where we’ve been sitting in the car for over an hour and moved just a mile or two!

Indeed, 91% of all respondents found themselves stuck in traffic over the past three years – with the maximum delay reported to be about 1.3 hours when averaged across all cities. Usual delays are 30 minutes (28%) to one hour (27%), but there was a surprisingly large portion of respondents who faced delays of over one hour (35%). Cities routinely experiencing delays of about two hours are Mexico City, Moscow, Beijing, Shenzhen and Nairobi; and in Moscow, an

astonishing 45% said they had been stuck in traffic for three hours or more. Buenos Aires, Madrid and Singapore are those experiencing the least delay, relatively speaking.

Forty-one percent of the respondents overall believe that traffic has worsened over the last three years in the areas where they commute, while, by contrast, 34% believe it has improved. Bangalore, New Delhi, Beijing, and Shenzhen showed the highest percentage of people claiming improvement, while Buenos Aires, Mexico City, Paris, Milan, Moscow, and Johannesburg showed the highest percentage reporting decline. The large investments in transportation infrastructure in China and India could explain the improvements there. In Stockholm and Nairobi – at opposite ends of the traffic spectrum in our survey – about half reported decline, half improvement. It appears to be the case that generally, cities with above-average traffic pain reported improvement while those with below-average traffic pain reported decline – a kind of regression-to-the-mean.

Furthermore, when compared to last year's survey, in many cities there were big jumps in the percentage of respondents who said that roadway traffic has improved either "somewhat" or "substantially" over the past three years. However, within this year's survey alone, far more commuters rated their traffic experience as worse than rated it as improved. In fact, in 12 out of the 20 cities, commuters rated the traffic experience as significantly worse when netted against those who rated it as improved. Only New Delhi, Beijing, and Shenzhen commuters indicated that, net, traffic had become significantly better. And, in those cities, the results were resoundingly better: the improvement out-stripped the negative by 30% or more. Clearly, in some very-high-traffic cities, some efforts to fix traffic are paying off.

Perceptions and other aspects of the commute

Traffic comes in all forms, none of it pleasant, but stop-and-start traffic is considered the worst part of the commute (51%), followed by an unreliable journey time (31%), low speed (28%), and rude or aggressive drivers (27%). Only 11% say there is nothing to complain about.

Drivers in Los Angeles, Mexico City, India, China, Singapore, and Johannesburg listed stop-and-go traffic as their biggest commuter pain

Further on this score, some local differences surfaced. Drivers in Los Angeles, Mexico City, India, China, Singapore, and Johannesburg seem to be particularly vexed with the stop-and-start rhythm. Rude and aggressive drivers were dubbed a "commuter's pain" especially by people in Los Angeles,

Buenos Aires, Mexico City, Singapore, and the African cities of Nairobi and Johannesburg.

The survey also looked at whether traffic had any subjective negative effects on respondents' health. Forty-two percent declared their stress level had increased; 35% reported more anger; 16% percent each, respiratory problems and less sleep; and 13% claimed to have been involved in some sort of traffic-related accident.

Stress from driving is notably high in Mexico City, Milan, Bangalore, and Johannesburg (over 50% of respondents in these cities reported it). Respiratory difficulties arose most often in Bangalore, New Delhi, Beijing, and Shenzhen. Drivers in Moscow, India, China, and Singapore were the angriest about traffic congestion, while those in Milan, India, China, and Singapore suffered

health-affecting traffic accidents more than in other cities. By contrast, drivers in America, Canada, several European cities (London, Madrid, and Stockholm), and Nairobi were markedly less concerned about health threats stemming from traffic – indeed, about 40% said they do not feel traffic is affecting their health.

One glimmer of hope for reducing stress and other emotional effects of traffic is public transportation – which 41% of all respondents said they would value the most in this regard. But also, 25% of respondents said they would greatly appreciate more-accurate, more-timely information about road conditions, and 20% would prize the option to work at home. These are, of course, possibilities that technology has made far more available. The drivers most hopeful about the public transportation option are in Buenos Aires, Mexico City, New Delhi, Beijing, Shenzhen, and Nairobi, while drivers particularly craving better road-information are in Chicago, Los Angeles, Moscow, and the Indian cities.

Some consequences of traffic

One thing is for sure: traffic, if bad enough and protracted enough, changes behavior. This survey chronicles some of the ways it has, or will in the future.

A little over one-third of respondents reported changing the way they get to work in the last year, while the remainder clung to habit. Drivers in Mexico City, Milan, Bangalore, New Delhi, Beijing, and Shenzhen were the most likely to have changed, while Americans, Canadians, Londoners, Muscovites, and residents of Stockholm, Madrid and Nairobi were the most resistant – whether because they were the most habitual, or because change was simply impossible.

Forty-one percent of all respondents reported that at least once in the last three years, traffic was so bad that in the midst of a journey, they just turned around and went home (possibly encountering the same traffic jams on the way back!). The incidence of this about-face was especially pronounced in Mexico City, as well as in the Indian, Chinese, and African cities.

Even worse, 47% of all respondents said that in the last month they decided to forego a planned trip due to anticipated traffic at least once. Such discouragement particularly afflicted residents of Moscow, Bangalore, New Delhi, Beijing, Shenzhen, and Nairobi – again, the prime victims of traffic in our survey.

Further, among those respondents who had cancelled a trip, 24% had been destined for work; 21%, shopping; 17%, recreation; 11%, entertainment; and 11%, eating out. Clearly, traffic has a broad negative impact on economic activity. Devastatingly, about 40-50% of respondents in Buenos Aires, Mexico City, Milan, and Moscow failed, thanks to traffic, to get to work.

47% of all respondents have cancelled a planned trip in the last month due to anticipated traffic

Although rising gas prices are not cherished by commuters, they could do their part, the survey implies, to reduce traffic. A price increase of 10% in gas would cause 9% of all respondents to reconsider driving to their destination, and seriously consider other transportation options, like public transportation or carpooling. Those who would consider public transportation or carpooling with the lowest increases in gas prices are to be

consider other transportation options, like public transportation or carpooling. Those who would consider public transportation or carpooling with the lowest increases in gas prices are to be

found Paris and the Indian and Chinese capitals. On the other hand, for about 20% of all respondents, gas prices would have to shoot up by 40% or more to change their behavior.

Finally, if people could be liberated from the specter of traffic, what would they do with the additional time? The survey revealed that 56% of people would spend more time with family and friends, 48% would exercise (or exercise more), 40% would spend more time on recreation, 29% would sleep more – and 24% would work more. In this last category – more work – those especially prone to do it are in Milan, Bangalore, New Delhi, Beijing, and Nairobi.

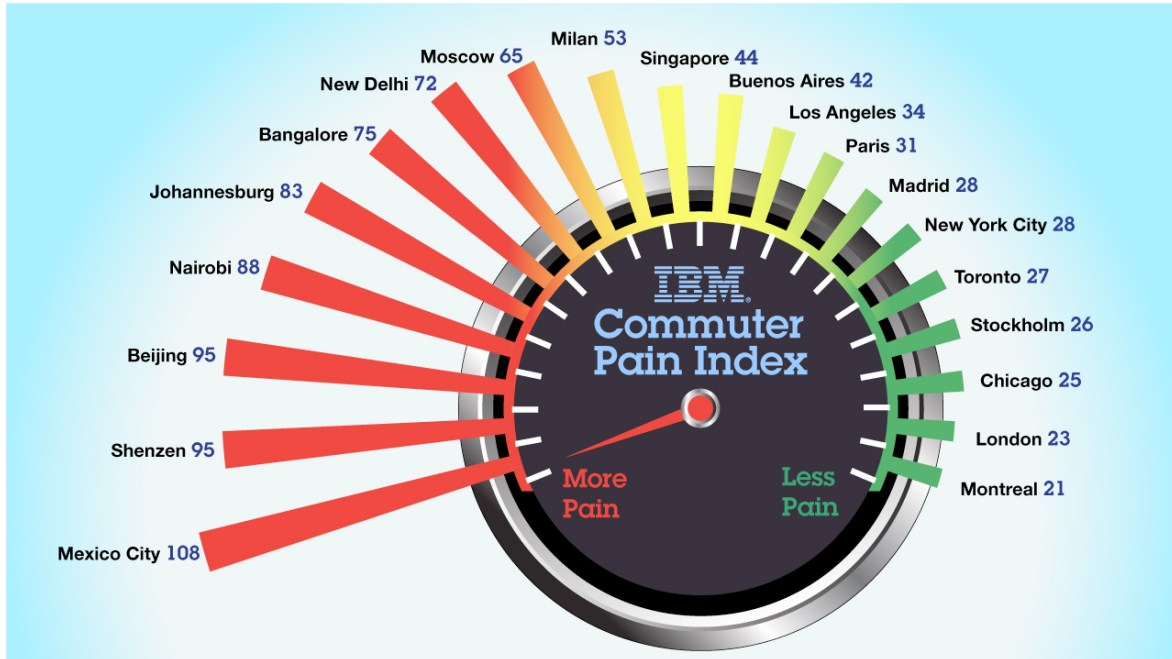
Follow-up

We will be following up this brief with a deeper study by IBM's Institute for Business Value that will shed more light on these survey results. There, we will look to uncover further nuances of cause and effect. What exactly is it, for instance, that makes Mexico City the 'worst' commuter city, and Montreal, London, and Chicago the 'best'? We suspect that we may be surprised by the results. That is, their causes may turn out to be different from the ones people might ordinarily posit, such as population size, economic growth, and the state of the infrastructure.

Commuter Pain Index

IBM compiled the results of the survey into its Commuter Pain Index, which ranks the emotional and economic toll of commuting in each city, with the highest number being the most onerous. The Index reveals a tremendous disparity in the pain of the daily commute from city to city. Montreal had the least painful commute of the cities studied, followed by London and Chicago. Here's how the cities stack up:

Commuter Pain Index



The index is comprised of 10 issues: 1) commuting time, 2) time stuck in traffic, agreement that: 3) price of gas is already too high, 4) traffic has gotten worse, 5) start-stop traffic is a problem, 6) driving causes stress, 7) driving causes anger, 8) traffic affects work, 9) traffic so bad driving stopped, and 10) decided not to make trip due to traffic. The cities scored as follows: Mexico City: 108; Shenzhen 95; Beijing 95; Nairobi 88; Johannesburg 83; Bangalore 75; New Delhi 72; Moscow 65; Milan 53; Singapore 44; Buenos Aires 42; Los Angeles 34; Paris 31; Madrid 28; New York City 28; Toronto 27; Stockholm 26; Chicago 25; London 23; and Montreal 21.

Conclusion

The 2011 Global Commuter Pain survey shows the pervasiveness of traffic; the pain caused by that traffic; the responses it provokes, or could provoke; and our collective wish to put to good use, as we see that good use, the time we would gain from decreased traffic.

This survey could precipitate a number of reactions. The absolute wrong one would be hopelessness – because as we increasingly know, traffic, bad as it is, is a problem that can be attacked.

The first step – as IBM knows from its research and countless client engagements – is to see traffic for what it really is. It is not simply a sea of cars clogging a street. Traffic is a symptom of the way our societies are organized, and operate. For instance, for the most part we insist that employees come to an office or other kind of site for work. For some forms of work this is unavoidable. But where we can effectively institute telecommuting, we should. At IBM, we see five broad categories of solution to the problem of traffic:

1. better route guidance, to use roads more efficiently
2. intelligent transportation systems, including better traffic prediction, to allow people to alter their routes or traveling times and allow system operators to manage the road network better
3. greater ease in switching between cars and various forms of public transportation
4. faster removal of road blockages due to damages or collisions from location-based information
5. more dynamic workplaces that allow telecommuting flexibility

The good news is that technology is making all of these solutions more possible and prevalent. The first two solutions are certainly coming alive as technology is increasingly getting the right information at the right time to traffic planners and commuters alike. With, for instance, smart phones, which are transmitting traffic information both from and to commuters, both planners and commuters are now more likely to know in real-time which roads are jammed and which are passable – and in real-time too, to react accordingly. Similarly, they can respond to accidents faster, clearing the road and resuming the normal flow. Increasingly, thanks to the ability, afforded by analytics, to derive traffic patterns from historical data, cities are looking at predictive systems that can alert commuters where the traffic is going to be. Telecommuting is of course a relatively standard technology now. And, in addition to new technologies, we may need to build some additional infrastructure so that people can more readily switch between their cars and public transportation.

What we know for sure is that, like any serious societal problem, traffic cannot be solved by any one institution or set of people. It will take the cooperation of business, government, and commuters, and it will involve a combination of careful planning and technology.

Authors:

Kalman Gyimesi is the Automotive and Industrial Practice Leader within the IBM Institute for Business Value. He has over 20 years of experience in industry and consulting. He has a background in business strategy, supply chain management and advanced analytics, and has worked on diagnostic and re-engineering projects with both automotive OEMs and suppliers. Mr. Gyimesi holds a Masters in Business Administration from Syracuse University. He can be reached at gyimesi@us.ibm.com.

Charles Vincent is a Partner and responsible for the IBM Global Business Services Travel and Transportation industry. He can be reached at charles.vincent@nl.ibm.com.

Naveen Lamba is the Industry Leader for IBM's Intelligent Transportation practice. Mr. Lamba's work focuses on developing innovative, next-generation solutions to address some of the pressing transportation issues today, including congestion management, advanced traveler information, improving performance of multimodal transportation networks through the use of analytical techniques. Mr. Lamba is a Civil Engineer with an MS in Transportation & Computer Aided Engineering from Carnegie Mellon University in Pittsburgh, PA. He also has an MBA for Carnegie Mellon University. He can be reached at naveen.lamba@us.ibm.com.