Key Insights

- Nanostores as an important channel in megacities in Asia, Africa and Latin America
- Future last-mile logistics networks will include urban transshipment points and multi-modality – pedestrian, bikes, small trucks, car sharing and public transport among others
- Creating the first city logistics toolkit to design better urban freight public policies (e.g. night deliveries, parking)

Why a Megacity Logistics Lab?

There are three major drivers of increased complexity of urban logistics networks.

First, urbanization is progressing at a high pace. While in 1950 only 54.5% of the population in developed countries was in urban areas, this number had risen to 77.7% by 2011 and is projected to reach 85.9% by 2050. Moreover, 25% of the world population and almost 60% of the world’s gross domestic product (GDP) will be found in the world’s 600 largest cities by 2025.

Second, the growth of Internet and mobile phone based electronic commerce is triggering an increasing amount of direct shipments from manufacturers and retailers to individuals. Direct deliveries do not only increase complexity of last-mile urban transportation networks, they also lead to fragmentation of shipments and higher complexity and greater need for coordination between consumers, retailers and manufacturers to distribute goods efficiently.

Finally, on-going efforts from cities to invest in public transportation, limiting road access and parking spaces in favor of pedestrian and public transit infrastructure, disproportionally impact logistics operations. Since urban freight also generates an important share of congestion, pollution and other negative externalities, city logistics activities are always under pressure from regulatory actions.

Better Logistics For Cities

Designing city logistics operations requires in-depth understanding of consumers and channels combined with high-resolution data driven modeling.

Reaching 50 Million Nanostores

City structures, income distributions, and shopping patterns in emerging megacities are very different from the ones in developed markets. A distinct retail characteristic is the presence of millions of very small, family-owned and operated stores. We call these nanostores. Reaching these nanostores with tailored logistics and channel strategies is the next opportunity in global retailing. A forthcoming book will include case studies showing a variety of strategies used by a dozen companies in Asia, Africa, Europe and Latin America that have achieved competitive advantage by serving these nanostores.

Big Data in City Logistics

Companies collect tens of thousands of data elements every day from a variety of systems and sensors in their logistics operations. Often, this data is archived and not used to improve or re-design their last-mile activities. Leveraging recent advances in data...
analytics, we are prototyping new algorithms that process GPS and cellphone traces to extract information on congestion, stop times and dynamic route choices.

High-Resolution Urban Logistics Design
Traditional algorithms used in logistics design – clustering, facility location or vehicle routing – do not adequately capture congestion or urban form, which are critical operational variables in urban logistics. By combining traditional optimization algorithms with GIS variables and efficient in-memory structures, we are developing the foundation for the next generation of logistics optimization tools.

Future City-Logistics Networks
The growth of e-commerce is pushing the limits of existing logistics network designs. We are re-imaging future city logistics networks that support omni-channel retail models, smaller store formats, increased intensity of deliveries, coordinate multiple transhipment points, engage a wider range of vehicle technologies – including public transport, electric and autonomous vehicles – while balancing complex inventory deployment strategies.

Better Cities for Logistics
City officials lack access to data and methodologies to help them design urban freight policies that balance the needs of citizens and consumers. We are developing a city logistics toolkit to guide policy design and evaluation: we envision current and future cities to be both friendly to people and freight.

The toolkit is being prototyped in eight cities: Mexico City, Madrid, Lisbon, Rio de Janeiro, Santiago, Quito, Bogotá and Singapore.

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2 A prototype version is available at http://bettercitysforlogistics.com

Opportunities for Engagement
- City-Level GPS or cellphone CDR datasets for analysis and algorithm development
- Case studies to design future last-mile networks in large urban areas (over 2 Million inhabitants), preferably including omni-channel dimensions or nanostores
- Industry and/or government experiments to evaluate urban freight policies
- Funding to continue open source tool development, including the city logistics toolkit

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