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Innovation in Urban Logistics

The Quest for Smart(er) Deliveries

by Jon Glasco



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Prior to the global pandemic, e-commerce growth was already placing a strain on the urban logistics sector. After the pandemic struck in 2020, U.S. consumers spent $861 billion on online shopping, a 44% increase over the previous year, and the logistics sector encountered a surge in demand for fast deliveries which stretched cities, delivery operators and drivers to the limit. For cities concerned about the impact of e-commerce deliveries, the post-pandemic era doesn't look much different.

In a report on the future of urban logistics, the World Economic Forum (WEF) predicts the number of delivery vehicles in the top 100 cities will increase by 36% in this decade (assuming no public interventions). If accurate, this growth will adversely affect sustainability, noise pollution, greenhouse gas (GHG) emissions, traffic congestion and public safety. While delivery and freight transport represents about 25% of urban traffic, it occupies 40% of road space and generates 40% of transport emissions.

How can cities, delivery companies and other stakeholders cooperate to solve problems involving urban congestion problems, reduce emissions and improve logistics optimization? Smart cities are conducting pilot projects and implementing urban logistics solutions through:

- Cargo e-bikes and microhubs
- Collection and delivery points
- Integrated retail and delivery models
- Collaborative ecosystems

Cargo e-bikes and microhubs

Replacement of delivery vehicles with cargo e-bikes and other electric vehicles offers opportunities to reduce the emissions impact. A report from Last Mile Experts predicts the last mile delivery sector in Europe could generate CO_2 emissions of 5.5 million tons by 2032. Switching to electric delivery vehicles should reduce the level of emissions to 1.3 million tons.

A study by the University of Westminster revealed that electric cargo bikes in London "completed deliveries with 90% less CO_2 emissions than diesel-powered vans. … Unlike delivery vans, cargo e-bikes rarely block traffic lanes, cycle paths or crosswalks when idle, which allows for life to go on as usual around them."

Some locations are adopting electric vehicles and deliveries much faster than others. The city of Oslo reported that electric delivery vans increased from 20% of the total urban fleet in 2020 to 35% in 2021. In contrast, UNO Logistica—Spain's logistics and transport business organization—estimates the volume of deliveries made with electric vehicles is only 2 to 5% of the country's total.

During the pandemic, Barcelona recognized the package delivery sector needs interventions to reduce traffic, noise and pollution—and to facilitate sustainable delivery systems. The volume of e-commerce deliveries in Barcelona escalated from 23 million packages in 2018 to 33 million in 2020, exacerbating congestion and emissions caused by motorized vehicles. The city decided to "subsidize seven local cycling projects promoted by local municipalities to replace motor vehicles with bicycles and cargo tricycles." The Barcelona city council also implemented a package of municipal initiatives, including an innovation to reduce failed deliveries through deployment of urban microhubs. The city is working with the private sector on projects and pilot tests of microhubs in municipal car parks.

Marta Pigem Jubany, a spokeswoman for the council, says that Barcelona awarded grants worth 250,000 euros to private and cooperative companies.

Collection and delivery points

E-commerce deliveries add to traffic congestion not only because of initial trips to deliver goods but also due to subsequent delivery attempts when people are not home. To reduce the adverse traffic impact, collection-and-delivery points (CDPs)—third-party locations which give consumers the option to collect parcels at a place near their homes—are deemed more sustainable.

The MIT Center for Transportation & Logistics says CDPs offer a solution through reinvention of e-commerce distribution networks that yield more efficient supply chains. CDPs reduce last-mile costs "by aggregating forward and return demand, reducing transit time for carriers, offering an alternative delivery location for failed deliveries and failed return pick-ups."

Last Mile Experts claims one courier distributing parcels to CDPs delivers about 1,000 items during a typical working day, compared with only 75 parcels per day for a single courier in the traditional delivery model.

Integrated logistics model

The Norwegian company StrongPoint is a world-leading provider of retail technology and logistics services. At the 2022 SIL Barcelona congress—an international logistics event—Irene Martin, StrongPoint's E-Com Sales Manager, said the company delivers retail tech and integrated logistics for grocery companies in more than 20 countries. StrongPoint believes the retail world has been transformed—initially through digital technologies and recently through the new normal of online grocery shopping in a post-pandemic world.

StrongPoint's home delivery solution supports the grocery retailer in handling multiple delivery slots, delivery vehicles and pickup points, and optimization of delivery routes. Their solution includes two-way communication allowing the consumer to communicate with the driver about changes regarding how, when and where to deliver an order.

Martin explained that building trust in StrongPoint's home delivery solution begins early in the e-commerce process when the online order is placed. This means trust is maintained from the retail employee experience in the early phase of the process all the way to the consumer experience in the last phase. Think of it as an *integration of trust-building practices* throughout StrongPoint's tech-enabled approach of receiving an online order, preparing for in-store picking, performing efficient picking and route optimization, ensuring traceable bags, entering data in the retailer's e-commerce system, and delivering the order to the consumer's home.

Collaborative ecosystems

It is hardly surprising that the pandemic raised our awareness of an urgent need for more coordination between cities and delivery operators. Urban Logistics as an on-Demand Service (ULaaDS)—a European project sponsored by the CIVITAS initiative—facilitates solutions in the cities of Mechelen, Bremen and Groningen. The overall mission was to foster sustainable cities "through deployment of innovative, shared, zero-emission logistics, while dealing with the impact of the on-demand economy." Three testing schemes in the ULaaDS project were used to evaluate collaboration in delivery ecosystems and demonstrate the effectiveness of:

- Containerized last-mile delivery by replacing vans with specially designed electric cargo bikes
- Integrated logistics management through a city-wide platform linking all urban delivery capacities
- Shared economy platforms for on-demand logistics

The city of Mechelen realized that finding solutions to logistics and delivery problems is a complex pursuit encompassing a diverse ecosystem of stakeholders, zero-emission and autonomous vehicles, cycles and cargo e-bikes, loading and unloading policies, vehicle entry restrictions, consolidation of microhubs and lockers, and open data policies. Through its participation in ULaaDS, Mechelen facilitated cooperation among multiple logistics operators. Belgian Post Group (bpost), Ecokoeriers and UPS cooperated in an inner city trial, while the Flanders Institute for Logistics and bpost worked on an outer city autonomous vehicle delivery trial.

In Spain, the Zaragoza Logistics Center (ZLC) is a leading research and educational institute affiliated with the University of Zaragoza and Massachusetts Institute of Technology (MIT). ZLC participated in the SPROUT (Sustainable Policy Response to Urban Mobility Transition) project with multiple pilot cities addressing last-mile delivery challenges—and pursuing a goal to deliver an innovative, data-driven policy for emerging urban mobility patterns.

Valencia, Spain, for example, is evaluating intermodal hubs within the city boundaries which bring together passenger and freight traffic, both public and private. A pilot project in Padua, Italy includes self-driving pods for cargo-hitching, giving passenger transport an additional freight-carrying capacity.

The ZLC also participated in the LEAD project (funded by the EU Horizon 2020 program) to create digital twins of urban logistics networks in six cities—supporting experimentation and decision-making in on-demand logistics in a diverse urban environments and delivery situations.

The sum of urban solutions

The World Economic Forum believes the urban delivery challenge "requires closer collaboration of all ecosystem partners" and development of logistics platforms "in which public-sector players of all sizes can exchange the most effective methodologies."

Can cities and ecosystem partners innovate fast enough—and make systemic changes—to keep pace with the growth of e-commerce and demand for fast deliveries? Accelerating a transition to logistics optimization and smarter deliveries will most likely result from the sum of urban solutions discovered through pilot programs, collaboration, university research and policy interventions.