

RECENT INNOVATION IN FREIGHT DELIVERIES

Sistem Manajemen Transportasi dan Distribusi Barang

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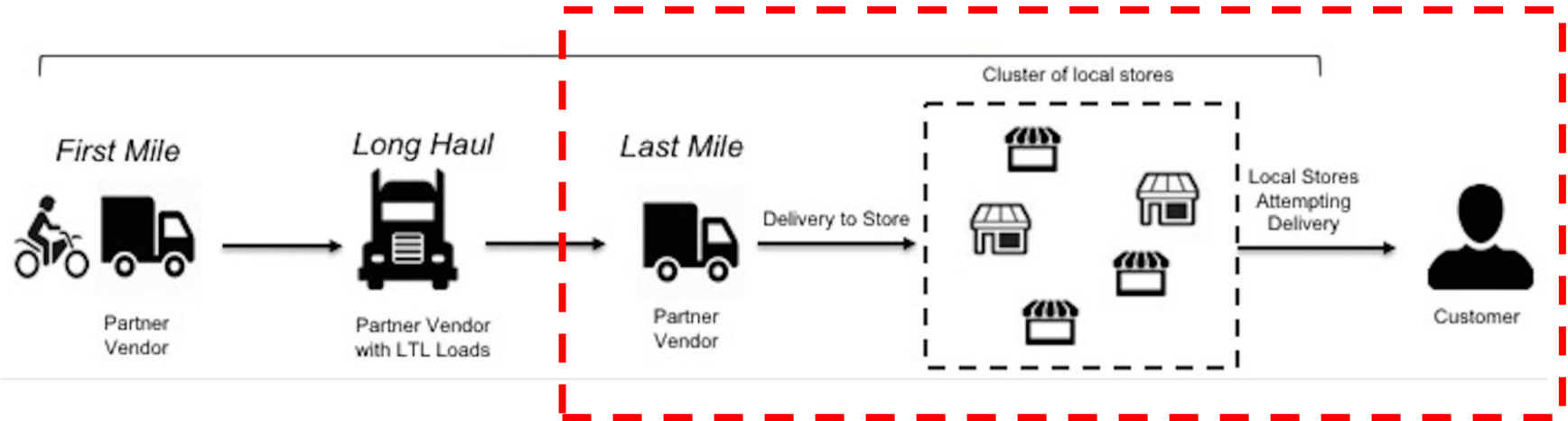


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Freight Transportation / Delivery

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High volatility
Spread Destination
Low volume delivery

Last-mile Delivery

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Definition:

- Movement of people and goods from a transportation hub to a final destination

Some facts of last mile delivery:

- The growth of e-commerce industry affect the last-mile distribution
- Its considered less efficient and comprises up to 28% of total delivery cost (Wang, et al., 2016)

Challenge:

- Consumers want faster and more frequent deliveries
- Backbone for the e-commerce business

What Happens in The Last Mile Delivery?

STEP 1

Requests or orders are entered into a centralized system.



IMPORTANCE:
This is the most effective way to keep track of all items.

STEP 2

Goods from manufacturing line or supplier arrive at the transportation hub or warehouse for delivery to their end users.



IMPORTANCE:
This is where the first stage of the last mile delivery process begins.

STEP 3

Task assignments are optimized based on routes and designated to delivery personnel.



IMPORTANCE:
This is essential for a more cost-effective logistics solution.

STEP 4

Items are scanned prior to loading onto delivery vehicles.



IMPORTANCE:
Tracking items reduces the risk of getting lost along the way.



IMPORTANCE:
Records should be verifiable for deliveries that have been made.

STEP 5

Proof of delivery is obtained upon reaching end user.

Online Orders Delivery



Preference of fulfillment location



Warehouse



Retail storefront



Retail store backroom



Dark stores

Two-hour delivery



12%



57%



12%



20%

Same-day delivery



15%



19%



43%



24%

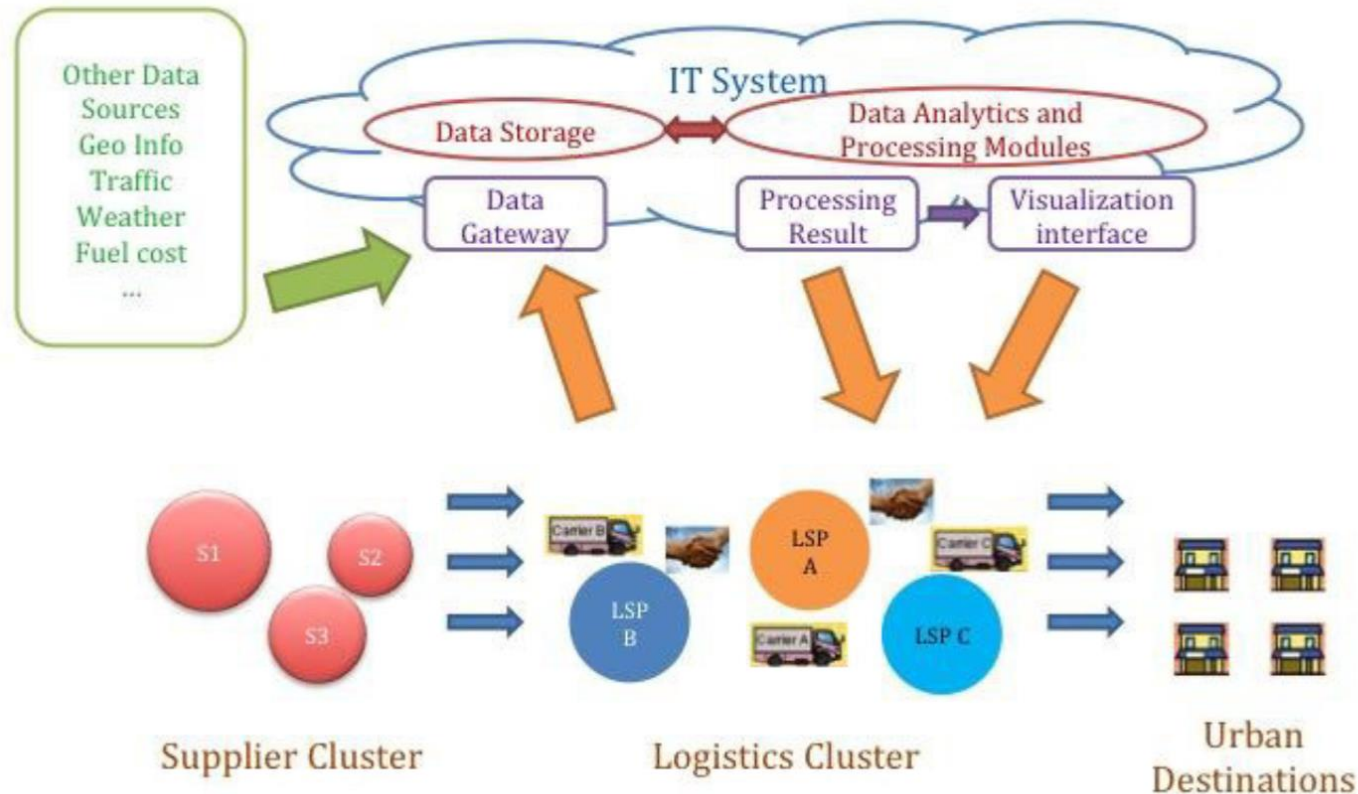
Innovation to improve last mile delivery

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- Collaborative and consolidation of urban logistics
- Shared Reception Box
- Crowdsourced Delivery
- Drone Delivery

Collaborative and consolidation of urban logistics

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Source: de Souza et al (2014) Collaborative Urban Logistics – Synchronizing the Last Mile

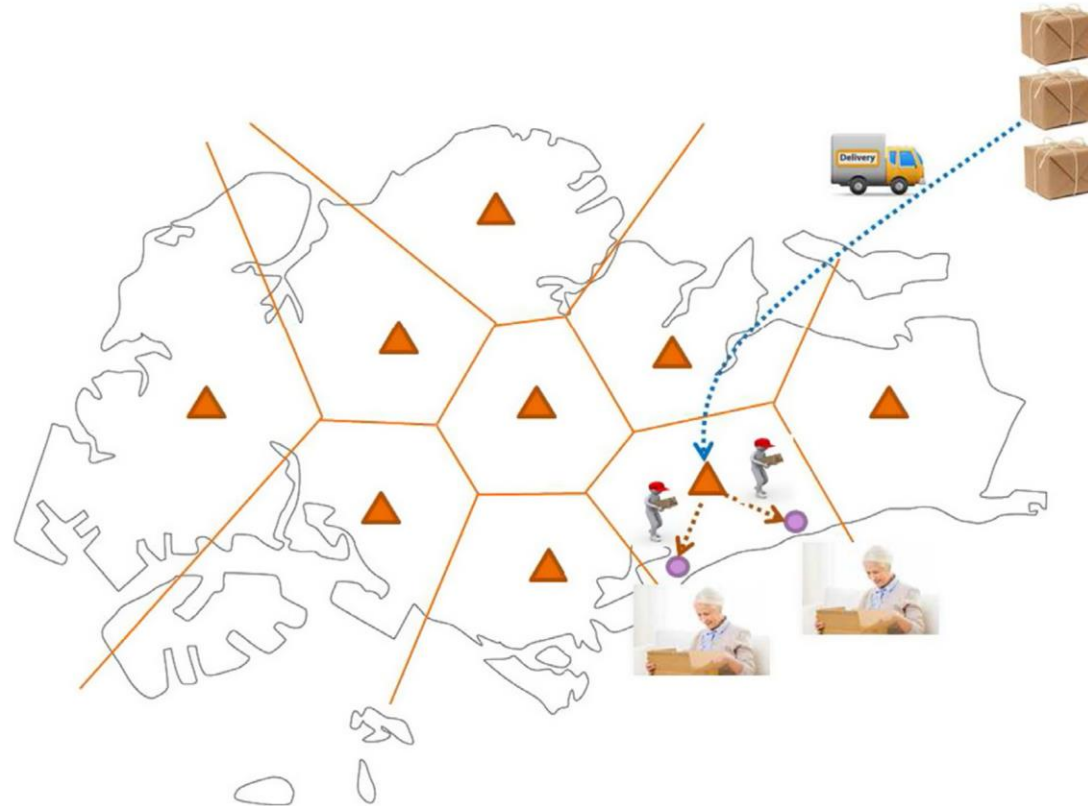
Shared Reception Box

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Crowdsourced Delivery Illustration

Y. Wang et al./Transportation Research Part E 93 (2016) 279–293



Crowdsourced Delivery

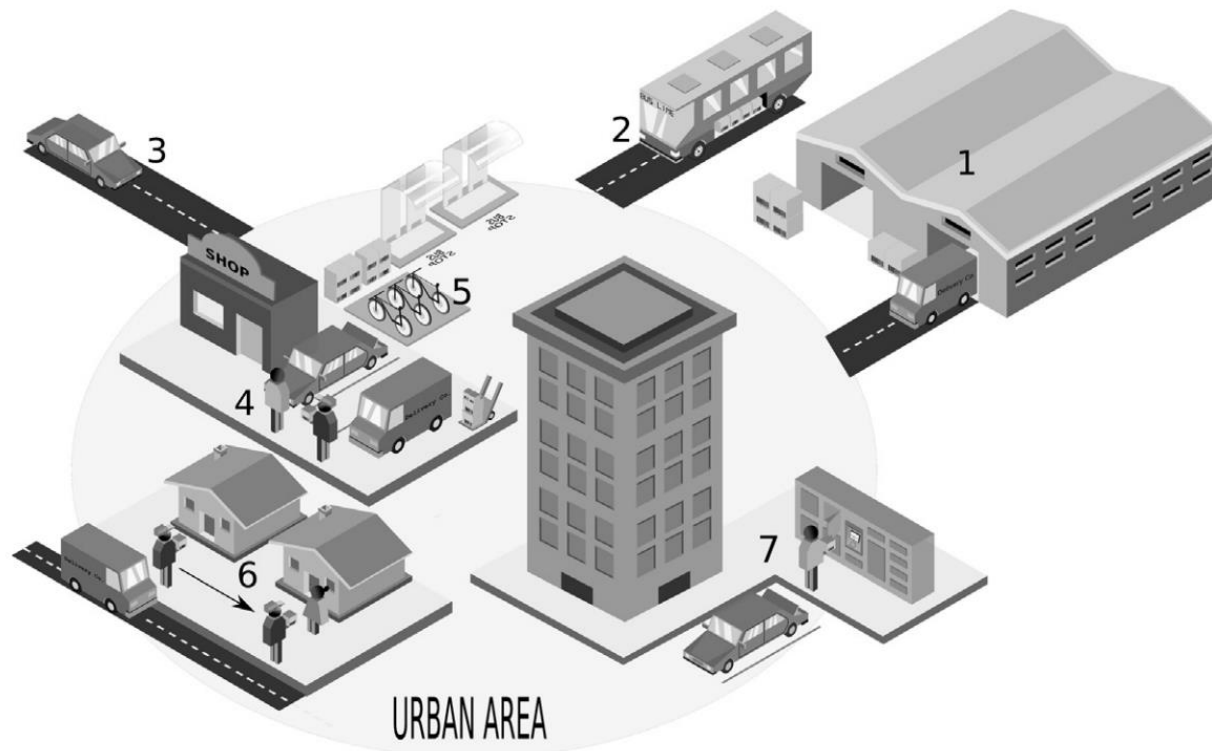


FIGURE 15.1 A schematic view of crowd logistics activities within urban environments.
Credit: Created by Afonso Sampaio.

Crowdsourcing Logistics Services

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Definition:

An information connectivity enabled marketplace concept that matches supply and demand for logistics services with an undefined and external crowd that has free capacity with regards to time and/or space, participates on a voluntary basis, and is compensated accordingly.

Crowd:

A large number of independent individuals, participating on a voluntary basis.

(Sampaio et al., 2019)

Type of Crowd Logistics

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- Crowd storage
 - ▣ Offers storage services, such as cellars, spare rooms, garages, or yards
- Crowd local delivery
 - ▣ Offers local delivery services, such as transportation resources that the crowd has access to and makes use of individual logistics capabilities to pick up, driving, and delivery
- Crowd freight shipping
 - ▣ Offers freight shipping services within a country or continent, such as transport resources that crowd has access to, mainly road vehicle
- Crowd freight forwarding
 - ▣ Offers freight forwarding services in which potential users of the services place ads informing crowd shipping needs, while peers post their forthcoming travel itineraries.

Crowd local delivery

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- Door-to-door service
 - ▣ Travelers announce journeys they plan to undertake and pick up and deliver packages for shipper if there is a similarity between the journey and the delivery plan.
- Store-to-door service
 - ▣ Crowdsources select and/or pick up goods from store and deliver it to the customer.

Cargo-Hitching

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Definition:

- Exploiting spare capacity available in public transportation including tram, metro, busses and taxi system in urban areas for the movement of freight.
- It can also sharing the infrastructure for the temporary storage goods, e.g. lockers in bus, metro, and train stations and parking garages.

Opportunity in Crowd-Logistics

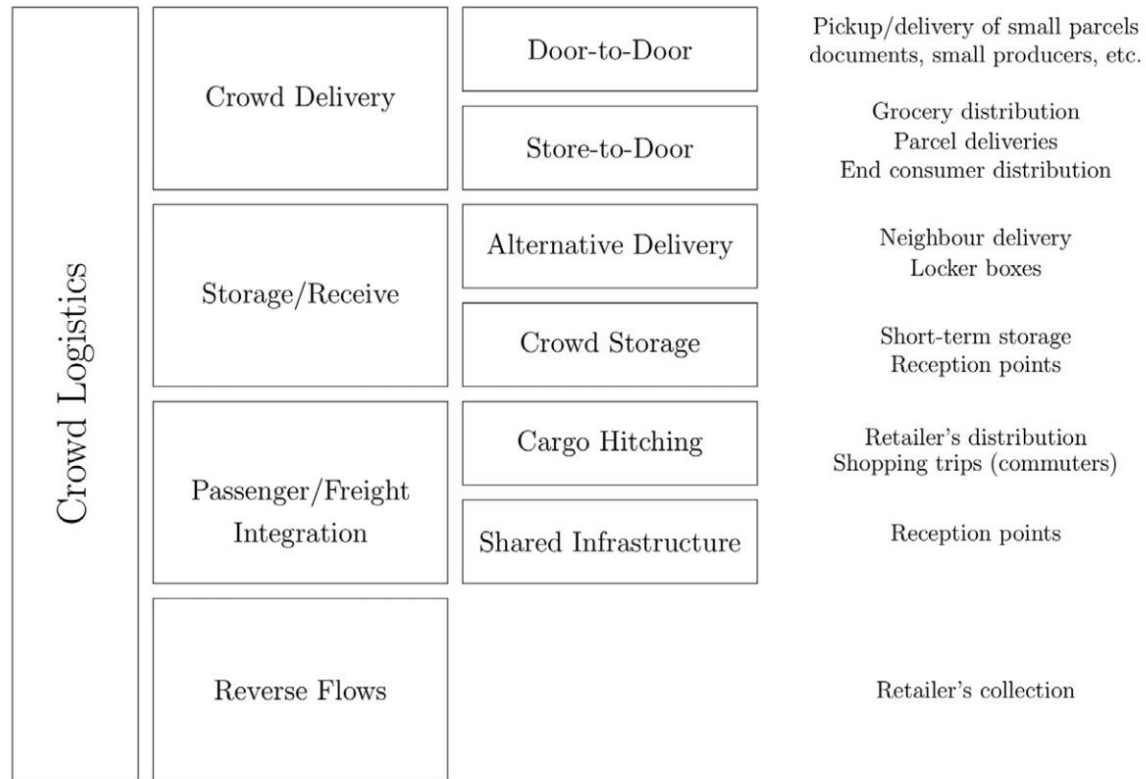
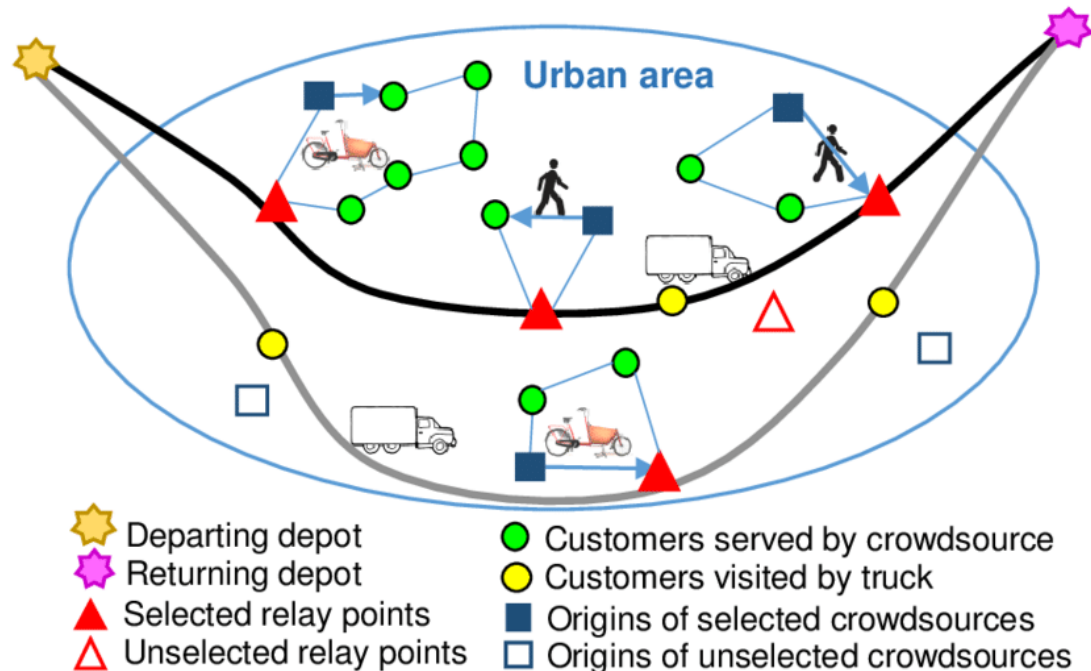


FIGURE 15.2 Examples of crowdsourced activities within city logistics. *Credit: Created by Afonso Sampaio.*

Crowdsourcing Rebound Effect

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- Drivers travel longer distances, particularly motivated by monetary compensation, can reduce the potential environmental effects.



Drone Delivery

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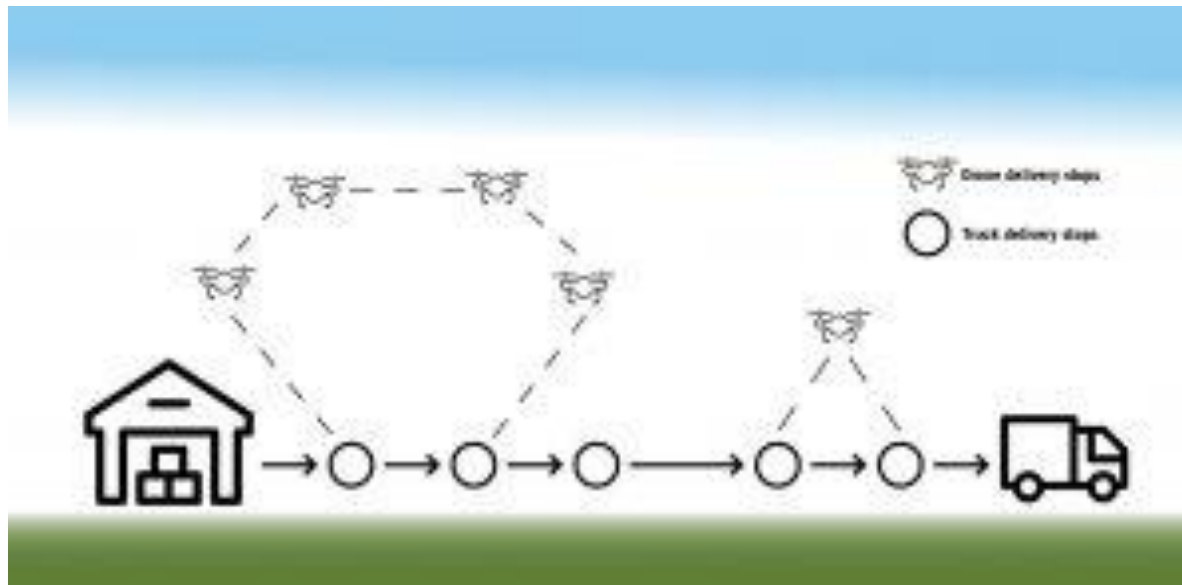


Figure 16: Urban First and Last Mile

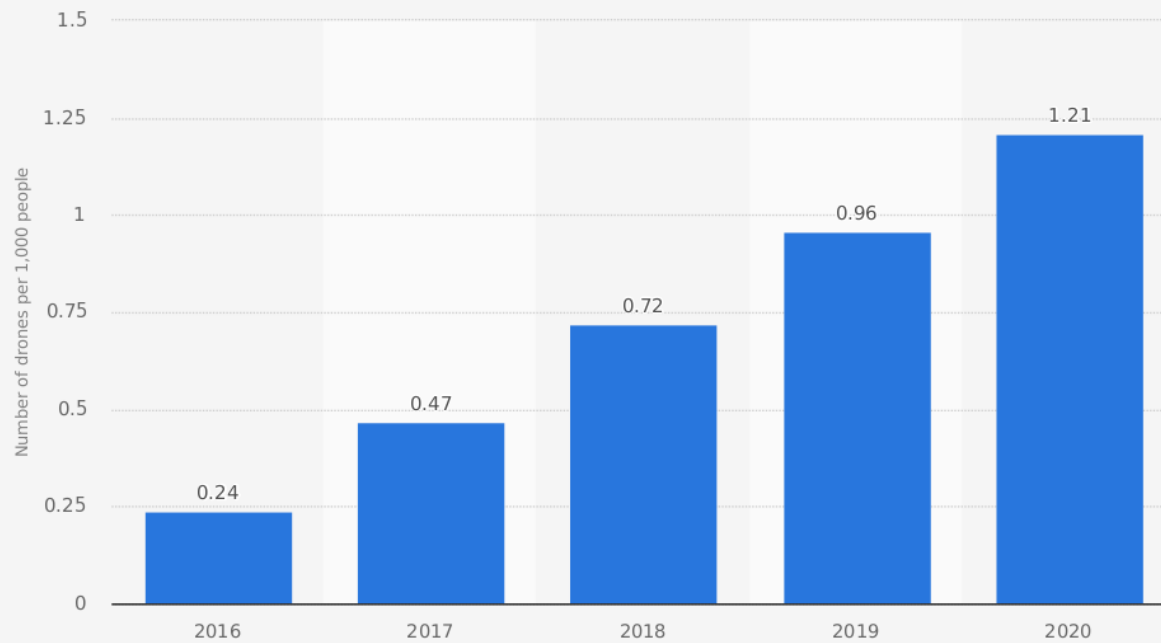
Drone Delivery

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- A delivery drone is an autonomous vehicle, often an unmanned aerial vehicle (UAV), used to transport packages, food or other goods.



Volume of drones in Amazon's fleet from 2016 to 2020 (per 1,000 people)*



Source
Ivey Business Review (Prashob Menon)
© Statista 2018

Additional Information:
Canada; United States; Ivey Business Review; December 2013

Drone Delivery Practice

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- Domino's Pizza (The first drone delivery)
- Amazon Drone Delivery
- Alphabet (Google) Drone Delivery
- UPS Drone Delivery
- Walmart Drone Delivery

Drone Delivery Benefits and Drawbacks

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Benefits

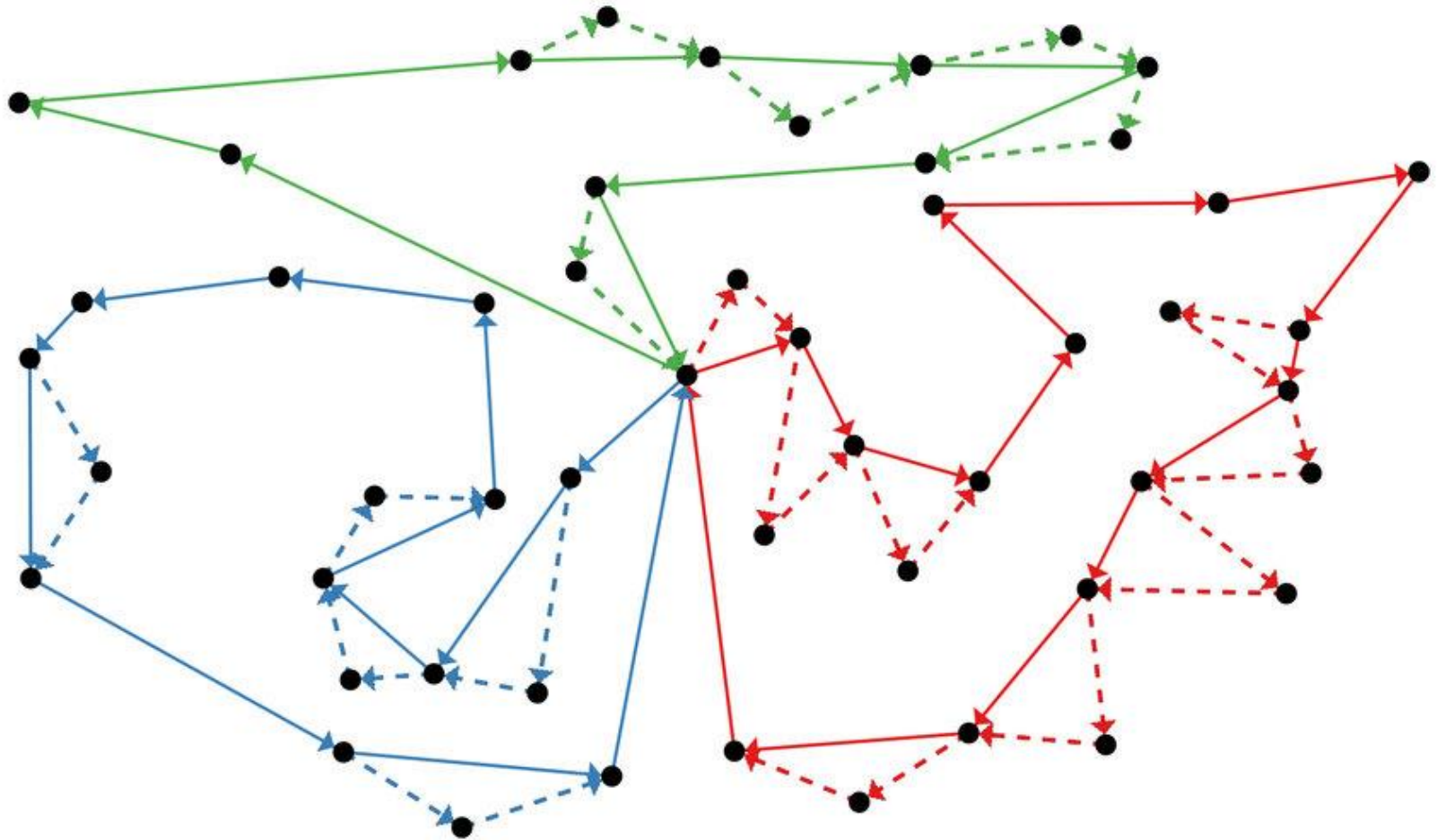
- Reduce delivery costs → Reduce costs charged to consumers
- Fast and reliable delivery
- Reduce emission, traffic, and environment negative impact

Drawbacks

- Privacy concern as drone would likely use GPS and Cameras to find homes and deliver packages
- Drones are an expensive device
- Delivery limitation on battery and drone capability
- Higher risk of defects during operation
- Stolen products
- Fewer job opportunities for delivery workers
- Threat of property damage

The illustration of Drone Delivery

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Drone delivery problem

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- 1- UAV = 1; Only one UAV is used
- 2- UAV = m ; A fleet of UAVs is deployed
- 3- UAV = 1, Truck = 1; One UAV works in tandem with one truck
- 4- UAV = m , Truck = 1; A fleet of UAVs working in tandem with one truck
- 5- UAV = m , Truck = n ; A fleet of UAVs working in tandem with many trucks

References:

Sampaio, A., Savelsbergh, M., Veelenturh, L., van Woensel., T. (2019) Crowd-based city logistics.

Carbone, V., Rouquet, A., Roussat, C. (2017) The Rise of Crowd Logistics: A New Way to Co-Create Logistics Value. Journal of Business Logistics. P.1-15

Khoufi, I., Laouiti, A., Adjih, C. (2019) A survey of recent extended variants of the traveling salesman and vehicle routing problems for unmanned aerial vehicles.
Drones

THANK YOU

