

Trends in Urban Logistics

Presentation to the ETH Zurich



Let me introduce myself

Matthias Hanke, Managing Partner, Zurich



- > Born 1965 in Hamburg, living in Basel
- > Married, two kids (19/21)

- > Apprenticeship in steel trading (2 years)
- > German Navy (2 years)
- > Combined Master studies of Mechanical Engineering and Business Administration at Technical University Darmstadt (6 years)

- > Junior Consultant to Senior Project Manager at RBSC (5 years)
- > Executive Vice President "Network & Strategy" at Swissair, Crossair, Swiss (4 years)
- > DHL Express (3 years)
- > Partner with RBSC in Zurich (9 years)
- > Key areas: Logistics, Aviation, Tour Operating

- > *Mobile: +41 79 372 3945, e-mail: matthias.hanke@rolandberger.com*

Let me introduce Roland Berger consultancy

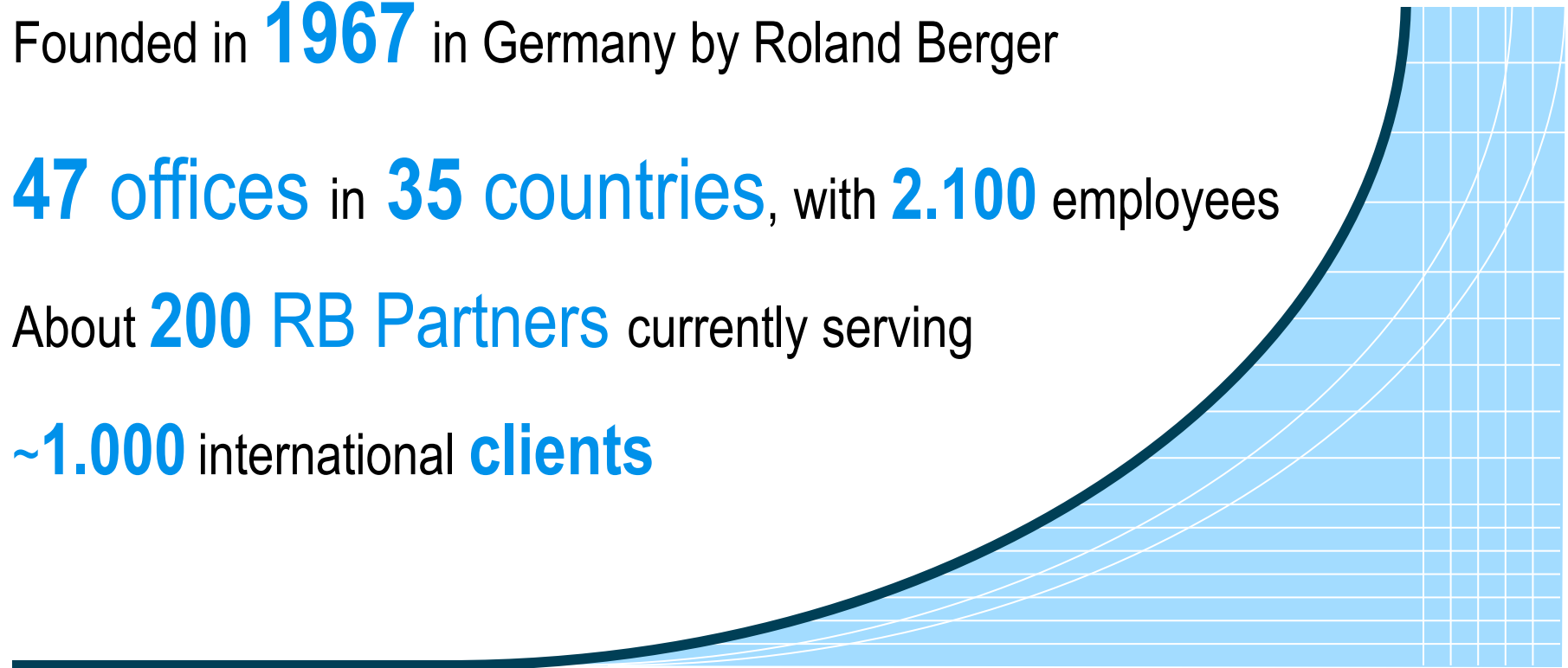
Our scope and global reach

Founded in **1967** in Germany by Roland Berger

47 offices in **35 countries**, with **2.100** employees

About **200 RB Partners** currently serving

~1.000 international **clients**







A. Introduction into Logistics



LSPs activities as a result of a continuous outsourcing process are being differentiated between 1/2/3/4 party logistics (PL)

Key differentiators

SHIPPER	<p>1PL </p>	<ul style="list-style-type: none"> > Shipper or consignee for a given manufacturing/ transportation flow (owner of the cargo) > Overall responsible for execution of logistics activities
LOGISTICS SERVICE PROVIDER	<p>2PL </p>	<ul style="list-style-type: none"> > Companies operating assets to execute the physical transportation of goods > Typical 2 PL players include airlines, shipping lines, trucking companies, and warehousing companies – asset heavy business models
	<p>3PL </p>	<ul style="list-style-type: none"> > Service providers that rely on consolidating and integrating multiple logistics services into a holistic door-to-door solution for customers > Maintains very limited physical assets and relies on purchasing- or leasing capacity from 2PL's (⇒ Forwarders)
	<p>4PL </p>	<ul style="list-style-type: none"> > Independent actors/ consultants that are organizing and managing complete <i>supply chains strategies</i> for their customers > Drive outsourcing decisions, supplier selection, cargo routing ...to support SCM; this way also manage subcontracting with 3PLs and 2PLs

More and more, the two perspectives on Logistics are going to merge, resulting from growing 4PL activities and new, platform based trading models

Perspectives on logistics

The "shipper/ consignee" perspective – Supply Chain Management

- > **Purchasing** of production material and logistics components
- > **Inbound** logistics
- > **Site/production** logistics
- > Production **footprint management**
- > **Distribution** logistics
- > ...

- > Overall **supply chain ownership** and accountability for all actions conducted
- > Actively managing **cost & quality** control
- > **Make or buy** decisions
- > Increasing **demands for sophistication** of logistics services

The "logistic service provider" perspective

- > **Transportation/haulier** Services
- > **Forwarding** Services
- > **Warehousing** Services
- > Logistic **Solutions/ Consultancy/ SCM** Services
- > **'Special B2C logistics'**
- > ...

- > **Network capabilities, knowhow & value added services** form strong USPs
- > Sophisticated **asset management** and/ or **capacity purchasing**
- > **Price-competitive** offering

Focus today

Logistics service providers can be clustered into 4 largely different groups

Logistics Service Providers

Key characteristics

Overland Transportation

- > Mainly **trucking**; growing share of rail
- > Forwarders often exercise "**Selbsteintrittsrecht**" and "operate"
- > Operation consists of **carriage** plus **terminal operation** for LTL business (groupage)
- > "Mama and Papa business" – low USPs ... **low entry hurdles**

Global Forwarding

- > Core business is **sea and air** intercontinental transportation
- > **Asset-light/ trading business** (capacity brokerage) plus **value added services**
- > **Low margins** (RoS; don't mix up with RoC)
- > **Interfaces** with Overland Transportation and Contract Logistics

Contract Logistics

- > **Coordination of parts of the supply chain** on behalf of the customer
- > **Warehousing and Distribution** are elements of core business
- > Contract duration over a **longer period** (~5 years) with dedicated **investments**
- > **IT integration/interfacing** with customer is key

Integrators; Express Logistics

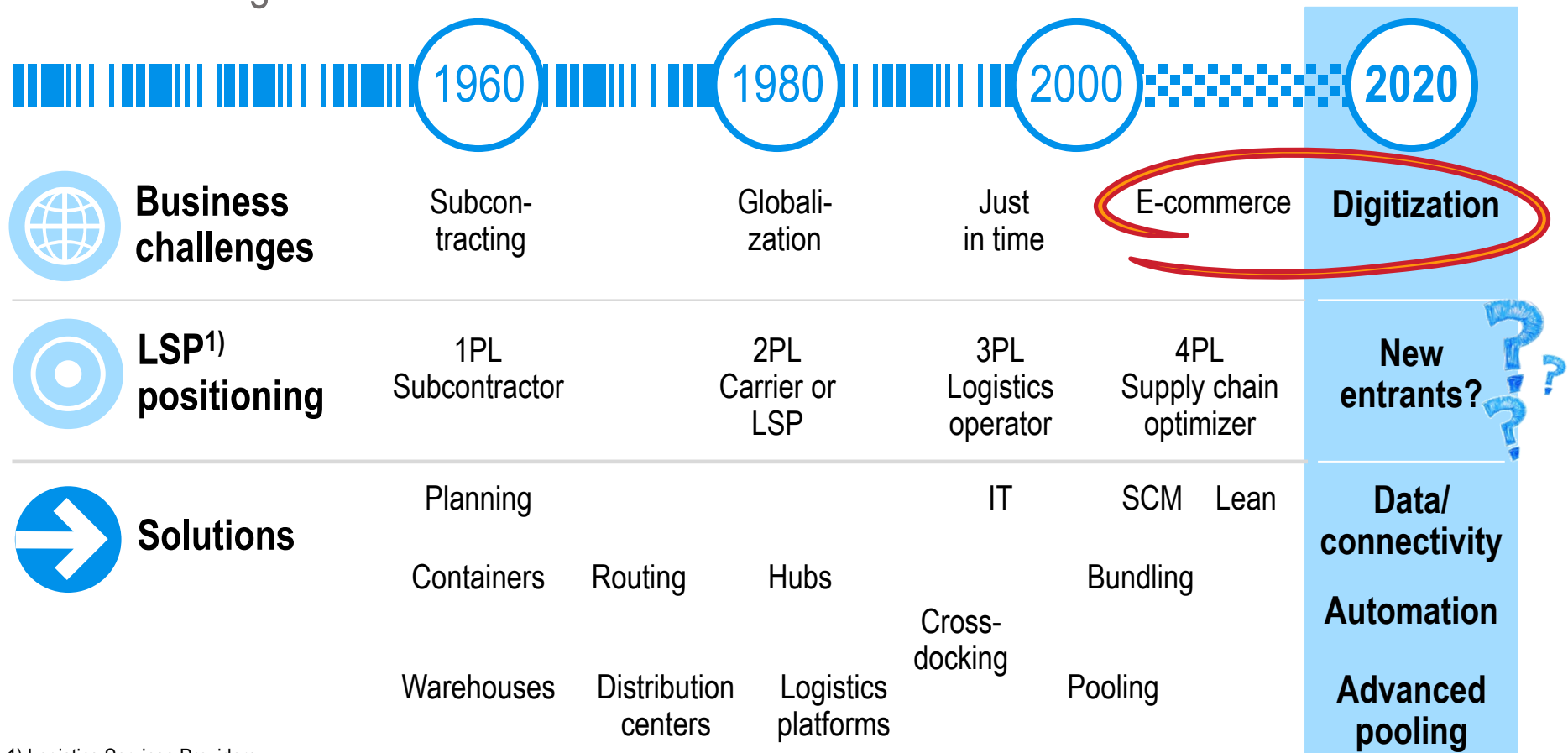
- > **Door-to-door** service, self operated (P&D, domestic linehaul, intl. linehaul, terminals)
- > Standing **network** – given fix-cost (flight gets operated ... full or empty)
- > **Day-definite** and **Time-definite** delivery plus even **courier-services**
- > **High-cost** proposition

B. WHY we need to talk
about Urban Logistics
NOW



E-commerce in combination with mobile devices and digitization are the major challenges for LSPs – the value chain is likely to change based on new demand profiles and on new entrants

Evolution of logistics solutions



1) Logistics Services Providers

To keep gaining market share, e-commerce players have no choice but to be more competitive in delivery time (1/2)

Example Media-Saturn



To keep gaining market share, e-commerce players have no choice but to be more competitive in delivery time (2/2)

Example Amazon Logistics

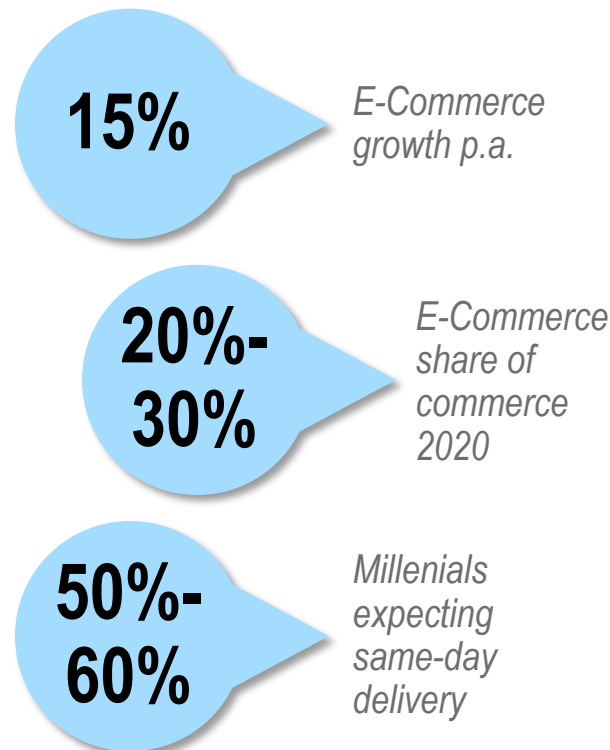


- ➔ **Prime Now** (25 US regions): One hour: 8\$, two hours: free!
- ➔ **US:** Amazon Flex (private couriers): one to two hours
- ➔ **Munich:** Partnering to secure 90 min deliveries
- ➔ **France/UK/India/China:** Proprietary city logistics networks with same/next-day delivery
- ➔ **Germany/UK:** City Logistic partner networks with same/next-day delivery
- ➔ **USA: Amazon Fresh:** Fresh food early morning

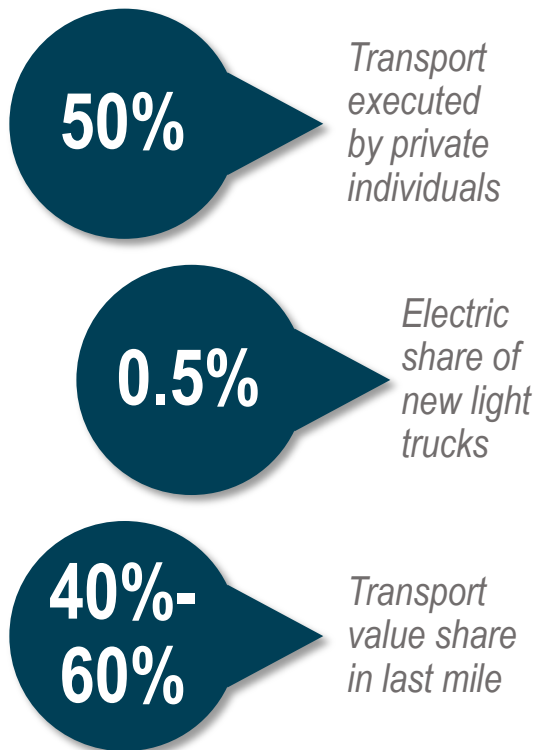
The amount and complexity of urban shipments is drastically increasing – with negative impact on cities

Development of urban logistics and its consequences

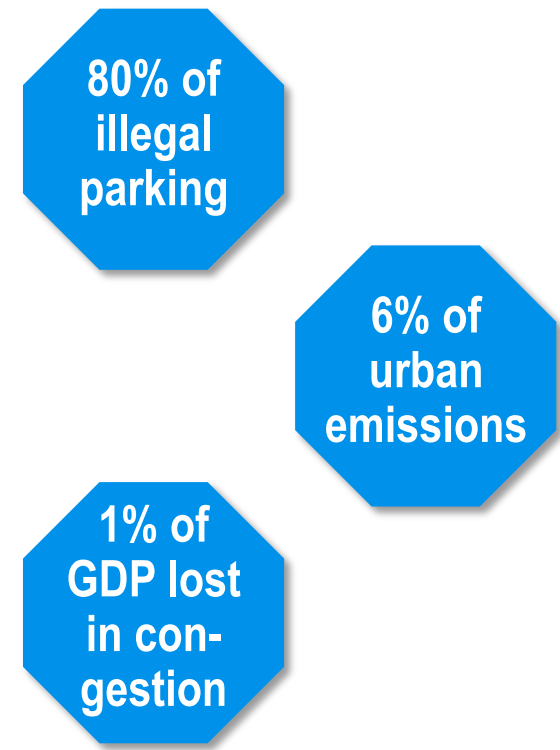
More and faster commerce



Many and interesting opportunities



Saturated and troubled cities

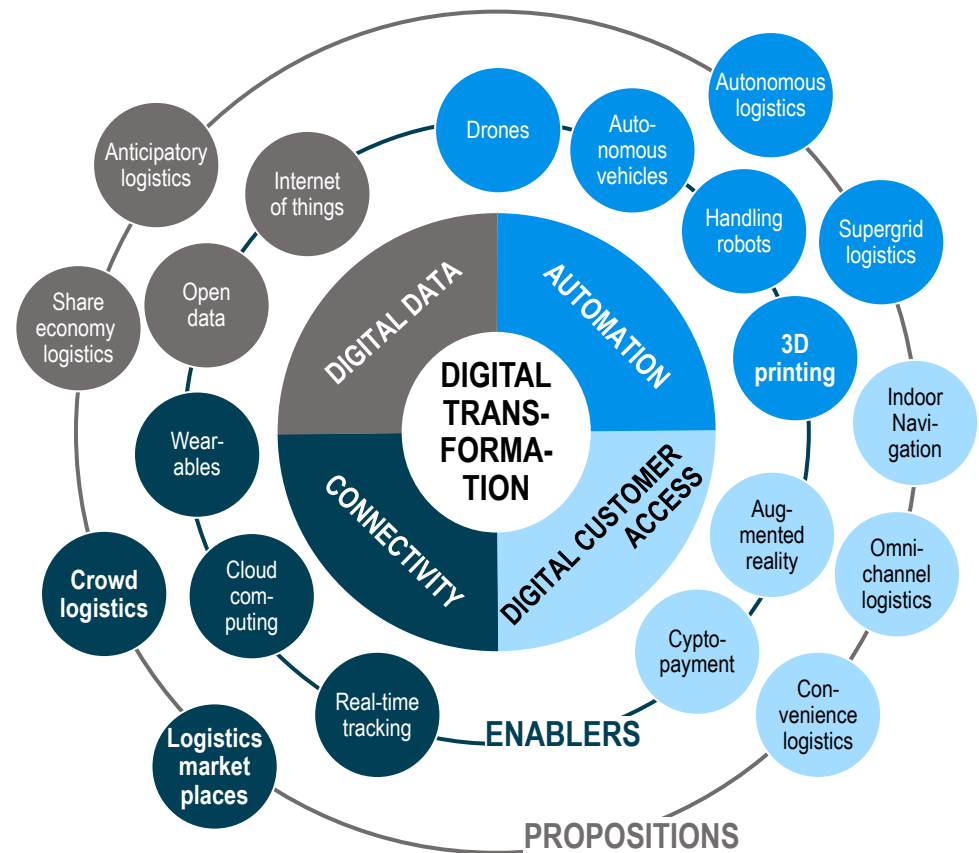


Digitization takes effect on logistics industry via four levers

'Industry 4.0'

- > **Digital data.** Capturing, processing and analyzing digital mass data allows better predictions and decisions to be made
- > **Automation.** Combining traditional technologies with artificial intelligence is increasingly giving rise to systems that work autonomously and organize themselves. This reduces error rates, adds speed and cuts operating costs
- > **Connectedness.** Interconnecting the entire value chain via mobile or fixed-line high-bandwidth telecom networks synchronizes supply chains and shortens both production lead times and innovation cycles
- > **Digital customer access.** The (mobile) internet gives new intermediaries direct access to customers to whom they can offer full transparency and completely new kinds of services

'Logistics 4.0'



Monitoring of recent start-ups and innovative companies in the logistics area gives a good impression on the value chain dynamics

1 Business intelligence and data



2 Freight marketplaces



3 Niche logistics operations



4 Automation



5 Green Technology



The lines between players in the logistics chain become increasingly blurred, new business models already challenge incumbent players

Examples of players and new entrants in the 'last-mile-landscape'

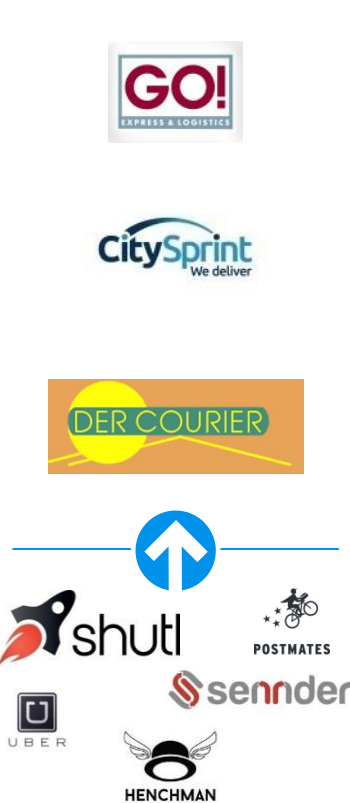
Parcel



Mail



Courier



Food



Freight



C. WHAT might urban
logistics LOOK LIKE?



The models build on four major building blocks: Infrastructure, Data, Collaboration, Automation

Urban Logistics building blocks – Overview

Infrastructure

- > Roads, rails etc.
- > Logistics facilities (warehouses, depots, docks etc.)
- > Parking spaces
- > Transport devices (trucks, vans, cars, bikes, etc.)



Collaboration

- > City Administration
- > Shippers (manufacturers, wholesalers, retailers)
- > Freight carriers (haulers, logistic providers, warehouse companies)
- > Retailers/online-retailers
- > Consumers

Data / Connectivity

- > Vehicle-to-vehicle (C2V) and vehicle-to-environment communication (C2X)
- > Telematics
- > Real-time tracking & tracing
- > Integrated logistics networks
- > New business models based on data mining/analytics



Automation

- > Automated pooling and consolidation centers
- > Automated workflow management
- > Automated driving technology

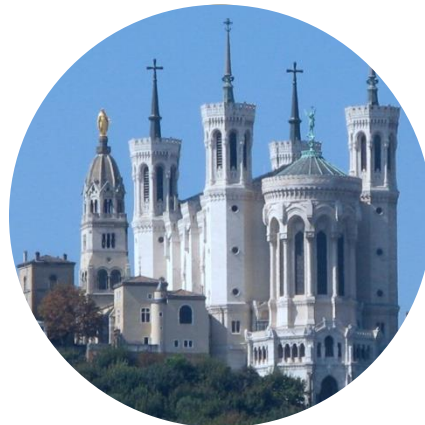
Densely populated cities are actively searching for solutions – But efforts are no game changers ... yet

Shortcomings of contemporary efforts



Time slots

- > Regulation of street parking of freight vehicles: max. stay of 30 minutes
- > Not solving the root cause
- > Difficult to control and enforce



Delivery space booking

- > Assigning of specific slot and duration of parking
- > Charges depend on the earliness of booking
- > Challenge: long check-in time at delivery



Berlin BentoBox

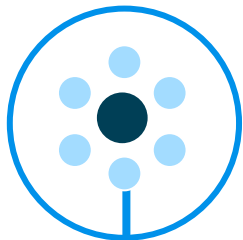
- > Collection- & distribution point for courier services
- > Replacement of car delivery with bike delivery
- > Only limited fields of application and acceptance

We believe that we will see a redesign of urban logistics along five models that will compete and complement each other

Models for a new urban logistics

Eco-regulation

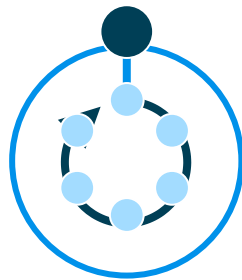
Multiplication of taxes (Ecotax, transit tax) on the initiative of cities or countries and strengthening of European or local regulatory framework



Daisy

Public service delegation

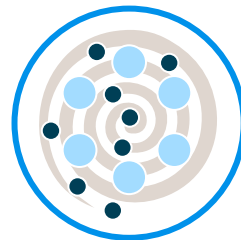
Oligopoly of carriers having the exclusive right to transport in the city and consolidating flows for the different carriers or shippers



Solitaire

Rolling stores

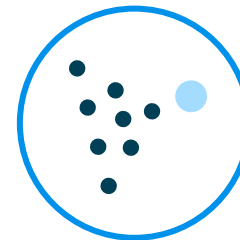
E-retailers entering clean transport business in densely populated areas to gain market share in comparison to stores with their offers of same-day-delivery



Vortex

Crowd logistics

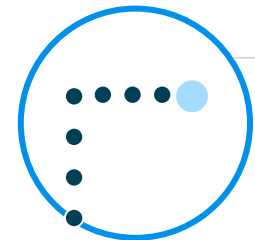
Automated electronic platforms performing matchmaking between shippers and carriers - independent of the organizers of transportation



Swarm

Automated logistics

Automated end-to-end delivery solutions

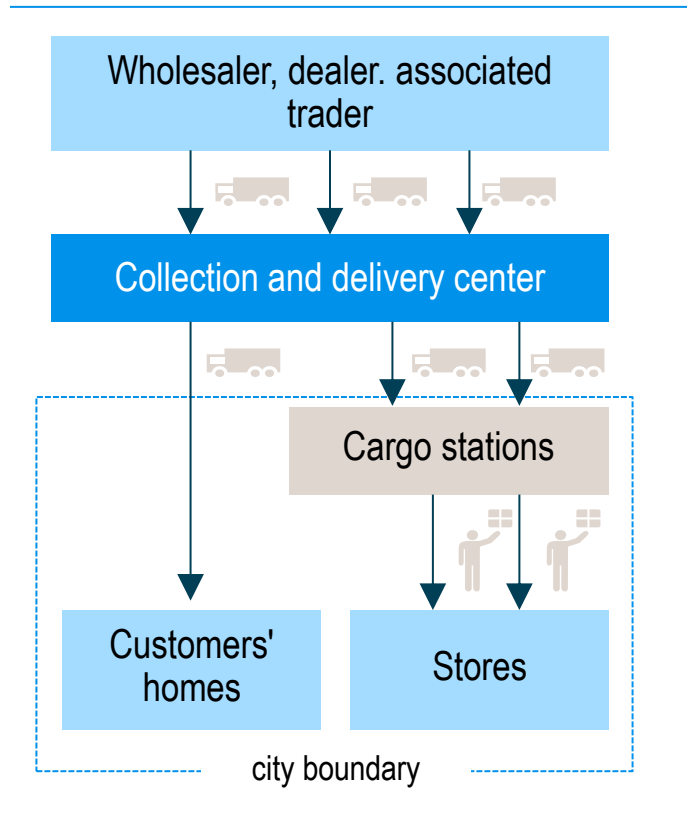


Anthill

details to follow

A city's infrastructure capacity could be vastly increased simply by consolidating freight traffic outside of the city ...

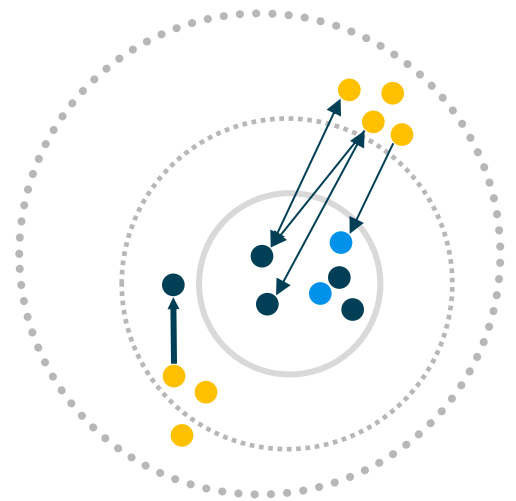
Concept of freight consolidation



- ➔ Freight consolidation platforms **bundle shipments from different wholesalers/ manufacturers** to serve customers within one specific area
- ➔ Wholesalers, dealers and associated traders deliver goods to an **extra-urban collection and delivery center**
- ➔ After picking, goods are either transported directly to the customers' homes or to inner-city cargo stations
- ➔ Goods are picked up from **inner-city cargo stations** and delivered via transport vehicles to stores
- ➔ **Objective is to reduce CO₂ emissions and congestion**

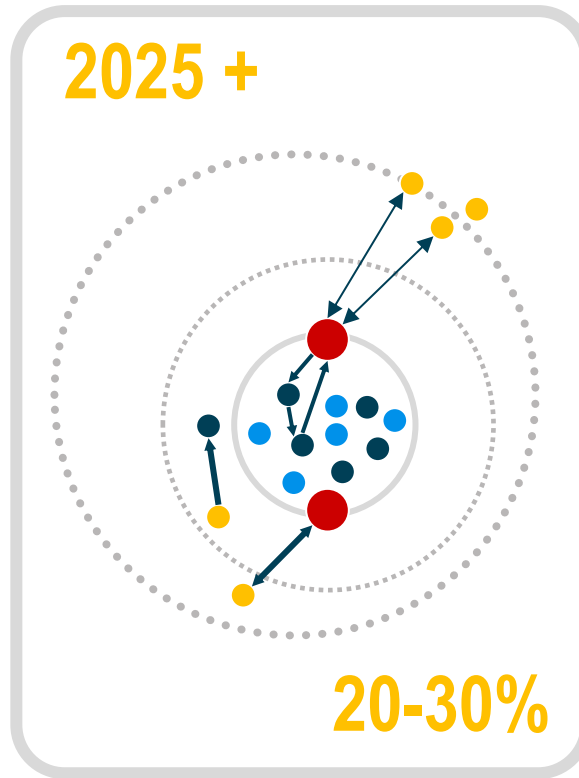
... and how it might look like

Today



Delivery to private individuals **10-15%**

2025 +



20-30%



- > E-commerce increase and fragmentation of deliveries
- > Better utilization of infrastructures and fleets
- > Congestion and pollution of urban centers
- > Multiplication of pilots: Guangzhou, Amsterdam, Kyoto, Monaco, Versailles, Paris, Lyon, ...



- > Difficulties and additional organization costs
- > Risk of market loss for carriers
- > Unproven economic viability for operators

● Warehouses (DC)
 ● Stores
 ● Home delivery
 ● Consolidation centers
 — City center
 1st belt
 2nd belt

New players with already amortized assets could change the game – Making business models more profitable

Infrastructure concepts – France



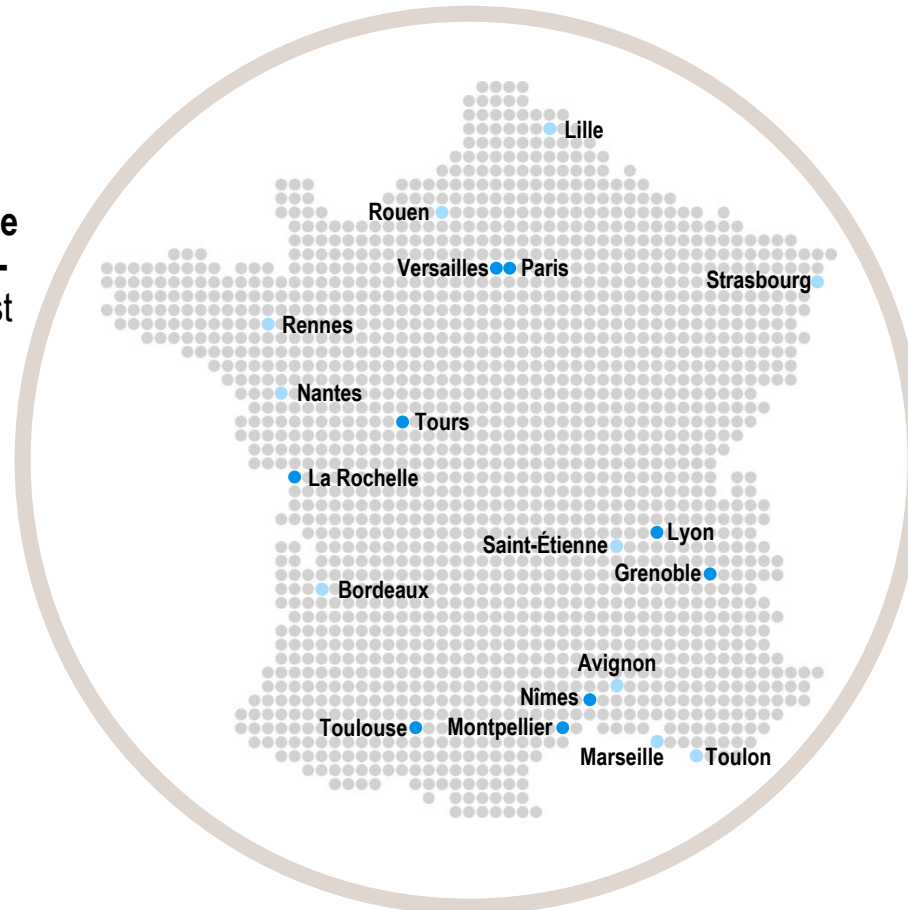
Paris 15th

3,000 sqm **Urban Logistics Space** serving as an **entry hub for multi-modal deliveries** in Paris. The last km is ensured by small urban vehicles part of which are electric. A second platform is to be built in the south of Paris.

La Rochelle Urban Logistics Space

Launched in 2001, **operated by a unique carrier**, it only reached break-even point in 2012.

- Urban Logistics Space currently tested
- Discussion in progress



City logistics Lyon

newest example, consolidating flows from various operators (former postal distribution center)

Multiple pilots launched to supply central London via dispatch centers and efficient last mile transportation

Infrastructure concepts – London example



London Freight Plan

as embracing/driving initiative for re-development of freight movement in London



Central London



- > Inner city rail connections for sustainable logistics in central London
- > Using trains to transport bulk goods and smaller low-emission road vehicles for last mile deliveries
- > Installment of small consolidation center outside London to enable individual deliveries to be grouped together, minimizing the number of vehicles and trips involved
- > Goal is to encourage a shift to low-carbon transport modes, consolidation and last-mile logistics as a commercial service

Total transparency in transportation can be created by developing technological capabilities and integrating them into system solutions

Potential of data technologies

Technological capabilities



Real-time traffic monitoring and vehicle/load tracking allows intelligent route planning



High connectivity, data collection and transmission via vehicle-to-vehicle and vehicle-to-environment communication



New business models based on data mining/ analytics (e.g. shared logistics concepts, car as delivery box)

Integrated systems

Efficiency

- > Future integrated logistics concepts should improve efficiency in complex real-time fleet operation
- > Experts estimate 10% savings in overall trucking costs, through better utilization of load space

10%
savings

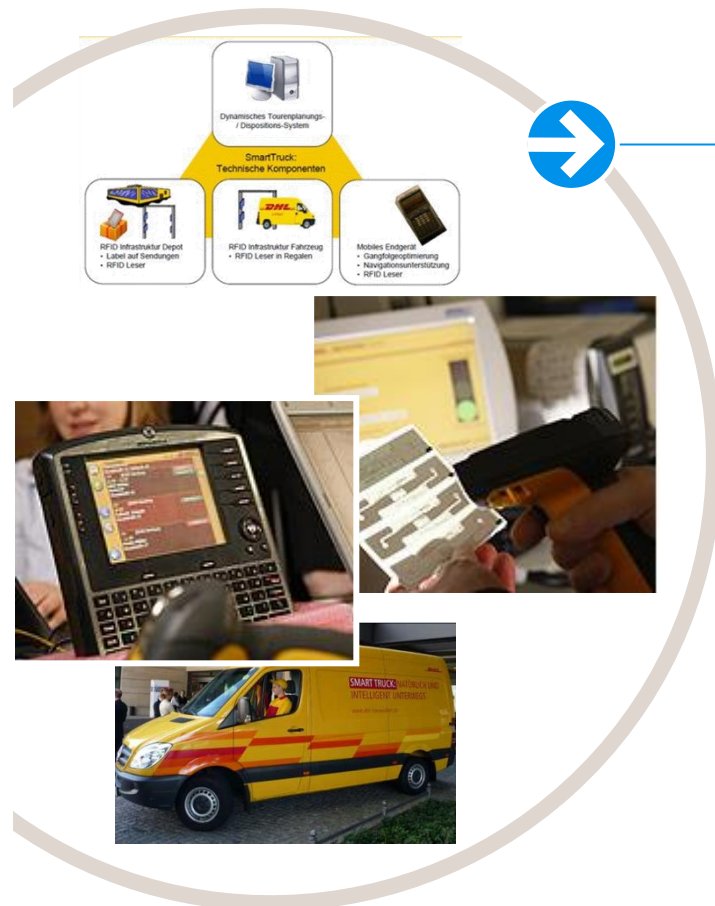
Safety

- > Lower accident rate and targeting of accident hotspots through V2V communication systems
- > Elimination of 70-80% of accidents caused by driver error through V2V technology

-80%
accidents

DHL combines advanced technology with dynamic route planning in its vehicles to increase efficiency in both pick-up and delivery

DHL Smart Truck



DHL SmartTruck



- > DHL fitted delivery vehicles with a **route planning software** which **calculates the best route** in advance based on real-time traffic information and permanently updates information about the parcels loaded
- > **Started in 2009** as a pilot project, DHL currently operates approx. **30 vehicles in Germany** – Results showcase savings of 15% in driven kilometers
- > Due to the successful pilot project, DHL started the operation of SmartTrucks in **Bangalore/ India** for express deliveries

The Hamburg Port Authority installed a smart city system to manage traffic flowing through the city induced by sea cargo

Smart City System in Hamburg



Smart City System



"The reality is this: The reason we would look for a holistic model is that we have all this business going through the city, but it impacts the citizens." Dr. Sebastian Saxe, Chief Information Officer, Hamburg Port Authority

- > Smart traffic system to optimize traffic flows and detect incidents earlier
- > Development of smart street lighting
- > Intelligent parking space control system for trucks and loaders

- > Started in 2011 when 300 roadway sensors were installed to monitor traffic across major roadways in the port area
- > Expansion of sensor network, addition of Wi-Fi hotspots and upgrade of system with video, photos and other data pieces to feed into a central management hub
- > Connection of road sensors via a IP network to monitor traffic flow; large digital billboards communicate with drivers about delays and traffic patterns
- > Provision of parking information through sensors, reducing the time drivers spend on the roads looking for parking
- > Outlook: Connecting the opening of bridges with vehicle and train traffic to manage current congestion peaks

Often small projects operate in isolation, and don't take off due to lack of an overall vision and integration plan

Examples of individual efforts (Berlin)

Urban logistics projects





<p>DisLog (2013-2016)</p> <p>> Distribution logistics with e-vehicles</p>	<p>Cycle logistics Ahead (2015-)</p> <p>> Use of special cargo bikes for CEP delivery</p>	<p>E-Truck (2014)</p> <p>> Pilot for e-Truck logistics of supermarket chains</p>
<p>Food delivery startups (2013-)</p> <p>> Delivery of food from restaurants by employing extensive bike network</p>	<p>Smartfusion (2012-2015)</p> <p>> Link emission threshold information with routes of heavy hybrid delivery trucks</p>	<p>SMARTSET (2013-2016)</p> <p>> Development of intelligent logistics terminal in Berlin's Western port</p>



- > Berlin has a big potential for optimizing urban logistics due to the increase in freight traffic and population density
- > The city's overall commercial transportation plan, however, was last updated in 2005
- > Nevertheless, parties from all parts of the urban logistics value chain participate in different urban logistics projects
- > Sustainable impact of those projects is limited due to a lack of coordination
- > Berlin needs a jointly agreed urban logistics vision and coordination of different initiatives

Many examples of successful collaboration exists – Partners are not limited to pure logistic providers

Examples of successful collaborations

Project	Description	Partners	Success factors
Local Freight Network, Gothenburg	> Based on regular meetings, different stakeholders of the logistics value chain work on continuous improvements, e.g. parking and unloading practice	> City of Gothenburg > Associations > Transport suppliers > Retailers	 Deep involvement of city administration
Freight Forum, London	> Stakeholders meet regularly to help Transport for London solve freight-related issues, e.g. ensuring delivery while 2012 Olympic Games	> City of London > Transport for London > Over 120 key freight organizations, e.g. VINCI construction	 Participation of stakeholders of the whole logistics value chain
Citylogistik-kbh, Copenhagen	> Development of central urban logistics hub and delivery to clients by electric vehicles	> Danish Ministry of Transport > Research institutions > City of Copenhagen	 Regular communication between partners
			 Reduction in emissions can be incentivized by reduction in delivery costs

Motomachi area developed a joint delivery system based on co-operative freight transport

Example – Motomachi (Japan)



Joint delivery system Motomachi



- > In 2004 a joint delivery system was established in Motomachi, Yokohama, Japan
- > Objective was to reduce CO₂ emissions and reduction of traffic volume in inner-city areas
- > The whole area (500 shops, 850 end-customers) is covered by 20 CNG-trucks using a system consisting of a jointly owned collection and delivery center as well as eco cargo stations all operated by one neutral carrier
- > Motomachi Shopping Street Association financially supports the neutral carrier with 2.4 million yen (17,000 Euro) per year and each participant (wholesaler, retailer etc.) pay 1.1 EUR per parcel to neutral carrier

Automation in urban delivery can be seen along the entire logistics & delivery value chain

Automated delivery value chain

Warehouses

Autonomous Transport

- > Support the transportation of goods during picking process via autonomous driving vehicles
- > Support loading/unloading processes

Automated order picking

- > Transport the desired shelf autonomously to picker to increase picker's efficiency and reduce walking time
- > Exchange picking vehicles autonomously if full capacity is reached with no idle time



Delivery

Automated transshipment hubs

- > Automated container and unit load device



- > Increased efficiency of trans-shipment hubs due to autonomous vehicles loading, unloading and transporting of container and pallets

Autonomous long-haul transportation

- > Assisted highway trucking
- > Convoying systems



- > Optimized vehicle utilization (less idle time due to driver's recreation time)
- > Improved vehicle operation and routing

Autonomous last-mile delivery

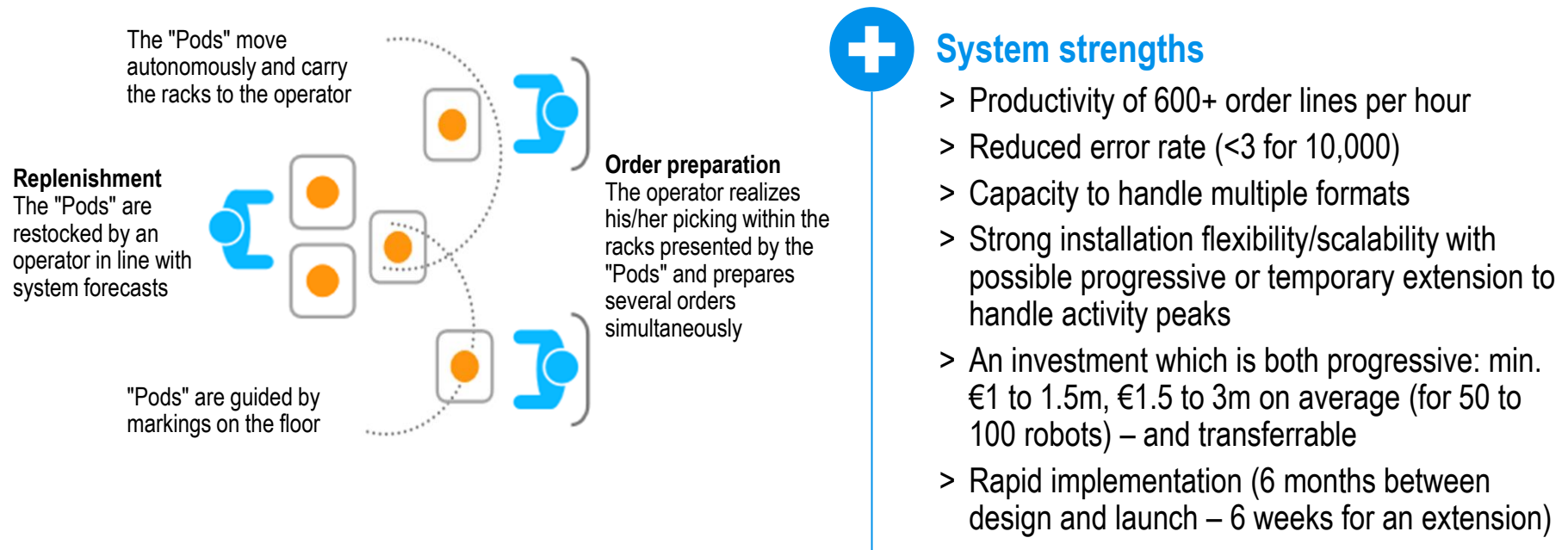
- > Support vehicles for letter and parcel deliveries
- > Self-driving repositories
- > Autonomous shared cars



- > Increased efficiency of post man
- > Reduced effort for recipient to collect delivery
- > Combined personal transport and delivery

Warehouse mobile robots have already changed the automation game in logistics

Automated warehouses: Example Kiva Systems automation principles



Kiva Systems was acquired in March 2012 by Amazon for \$775 m
Kiva Systems is the supplier of Zappos and Quidsi, both specialized e-merchants recognized for their quality of service – also acquired by Amazon

Other clients: Staples, Gap, Walgreens, Office Depot, Toys"R"Us

D. HOW can LSPs play to be successful?



In a nutshell: LSPs will have to review own business models/ USPs with a view to digitization opportunities and challenges and selectively invest to acquire new models from start-ups



In urban logistics, doing more of the same will backfire – We see seven management essentials

LSP guidelines – focus Urban Logistics

- 1 Start running, don't wait for the game to be clarified**
Test, fail and test again until you make the difference
- 2 Promote/ allow greenfield start-ups**
Thinking with existing infrastructure will only lead to minor moves – rather think in terms of offers and not capabilities
- 3 Don't overlook delivery startups**
Understand why they succeed or fail – even use them as your own lab
- 4 Decide if you want to make the race alone – or not**
And if you do make it alone clarify your USP, answering "why" you'll make the difference
- 5 Leverage new technologies**
Utilize existing technologies to offer the best customer experience – Further keep an eye open for new innovations and integrate them
- 6 Collaborate with authorities**
Align with them right from the start to ensure success of your new products
- 7 Secure trust of your stakeholders**
Too often new technologies fail because of missing consumer trust; build up trust in your products with subcontractors as well (e.g. drivers)



Roland
Berger

