Supply Chain Digitization

Presentation to the ETH Zurich

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Contents

Page

A. Introduction to Roland Berger 3

B. Introduction to basic terms in Logistics 6

C. Ready for take-off? … Supply Chain 4.0 10

D. Digital Supply Chain Planning 15

E. Digitization of LSP and Forwarders in particular 20

F. Robotics and automation in logistics 29

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A. Introduction to Roland Berger

Let me introduce myself

Matthias Hanke,
Managing Partner, Zurich
Central European Head of consumer Goods & Retail

- Born 1965 in Hamburg, living in Basel
- Married, two kids (20/22)

- 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 (11 years)
- Key areas: Logistics/ SCM, Aviation, Tour Operating, Consumer Goods & Retail

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

Source: Roland Berger

Let me introduce Roland Berger consultancy

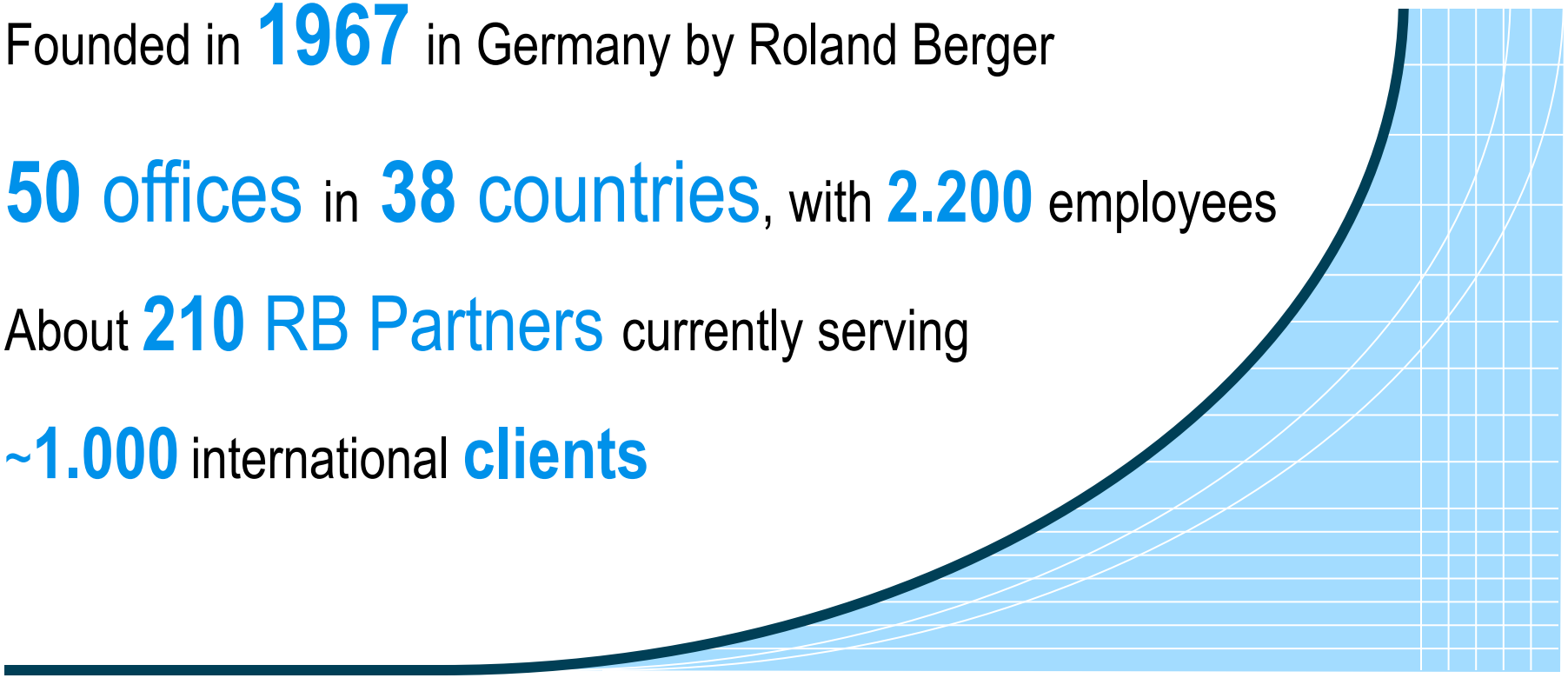
Our scope and global reach

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

50 offices in **38** countries, with **2.200** employees

About **210** RB Partners currently serving

~1.000 international **clients**



Source: Roland Berger

B. Introduction to basic terms in Logistics

In easy words: a company's supply chain manager is the customer of the logistics service provider – however borderlines are blurring

Cornerstones – SCM versus LSP – two different perspectives

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 **SCM optimization**

- 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 "Logistics Service Provider" perspective

- **Transportation/haulier** Services
- **Forwarding** Services
- **Warehousing** Services (Contract Logistics)
- **'Special B2C logistics'**
- **Value added services** along the supply chain
- Logistic **Solutions/ Consultancy/ SCM** Services … **4-PL services** (~SCM)

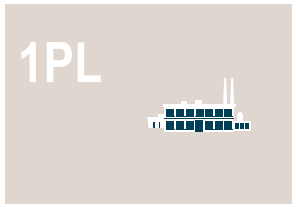
- **Network** capabilities, **knowhow** & **value added services** form strong USPs
- Sophisticated **asset management** and/ or **capacity purchasing**
- **Price-competitive** offering

Source: Roland Berger

There is an evolution of job-shifts from SCM to LSP to be observed

Key differentiation of logistics business models

Evolution of logistics outsourcing to various parties



> **No outsourcing at all**
> **Shipper or consignee** for a given manufacturing/ transportation flow (owner of the cargo)
> **Overall responsible** for execution of logistics activities

> 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**

> Service providers with a business model of **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**)

> **Independent actors/ consultants** that are organizing and managing complete *supply chains strategies* for their customers
> Drive **outsourcing decisions, supplier selection , cargo routing** …to support SCM; this way also **manage subcontracting** with 3PLs and 2PLs

Source: Roland Berger PL = 'party logistics'

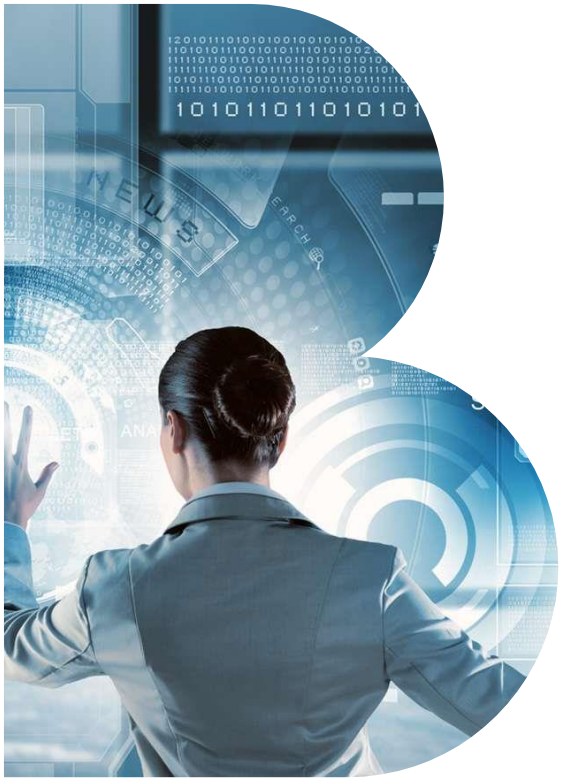
3PL (and 2PL) LSPs can be divided into four groups

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

Source: Roland Berger

C. Ready for take-off? … Supply Chain 4.0



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

Source: Roland Berger

Digitization takes effect on logistics industry via four levers

'Industry 4.0'

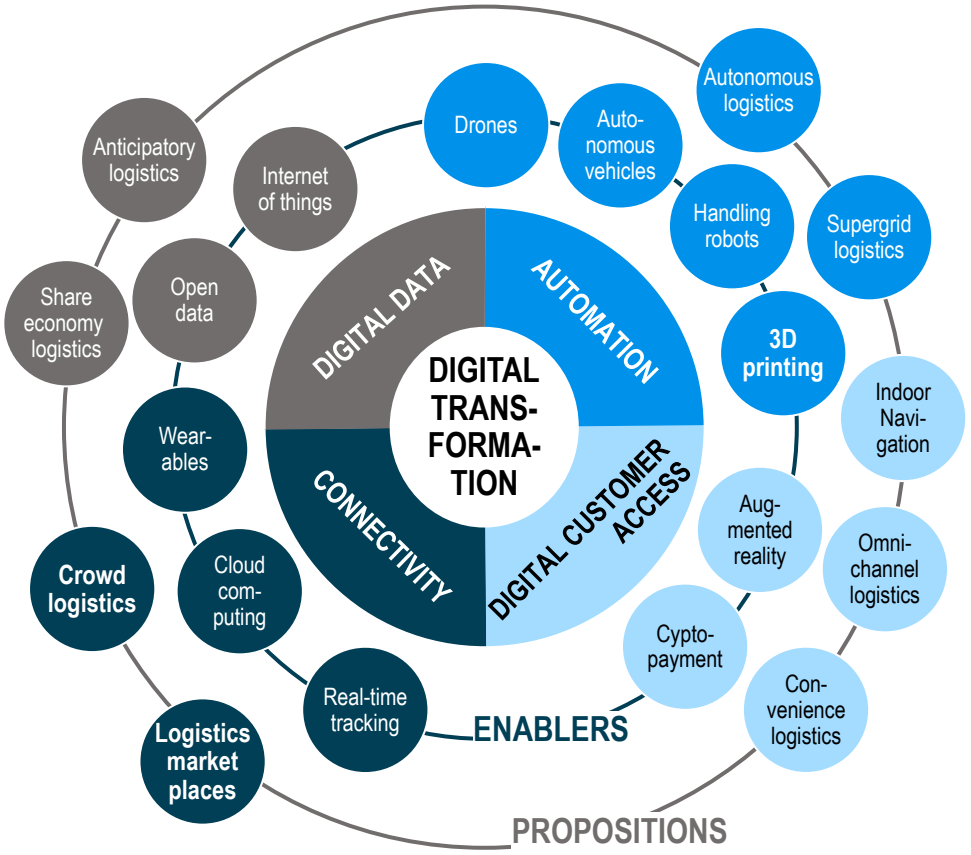
> **Digital data availability:** Capturing, processing and analyzing digital mass data allows better predictions and decisions to be made

> **Availability of new Automation solutions:** 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 across the value chain:** 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

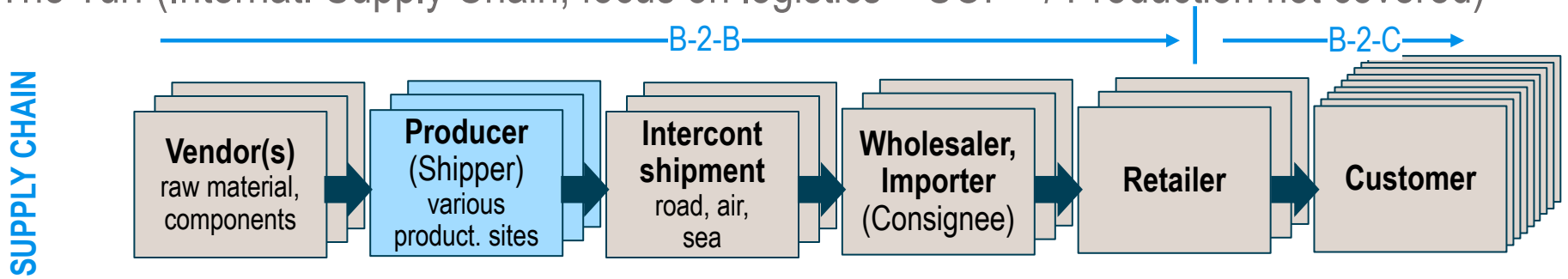
'Logistics 4.0'



Source: Roland Berger, joint study with BDI on effects of Digitization

Supply chain digitization is a multi-lateral and multi-procedural question – there is not ONE solution but rather HUNDREDS

The Turf (Internat. Supply Chain; focus on logistics – SOP[1] / Production not covered)



DIGITIZATION

autonomous trucking | *Digitized supply chain planning* | *digitized market places* | *shortened value chain (no retailer)*

fleet management | *tender platforms* | *GDS[1]-Freight* | *shipment platforms* | *online shopping* | *O-2-O[1] shops* | *prime-now*

AI-purchasing | *industry 4.0* | *3-d printing* | *demand forecasting* | *digitized LSP[1] processes* | *robots in retail and warehousing*

automated warehousing | *route optimization* | *IT supp. order management* | *e-cargo* | *crowd logistics* | *drone transports*

1) SOP= Sales and operations Planning, GDS= Global Distribution Systems, O-2-O= Online to Offline and v.v., LSP= Logistics Service Provider

Source: Roland Berger

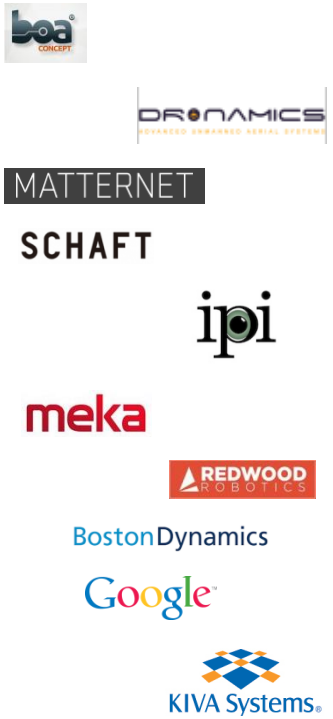
Monitoring of recent start-ups and innovative companies in the logistics area gives a good impression on the value chain dynamics

1 Business intelligence and data

2 Freight marketplaces

3 Niche logistics operations

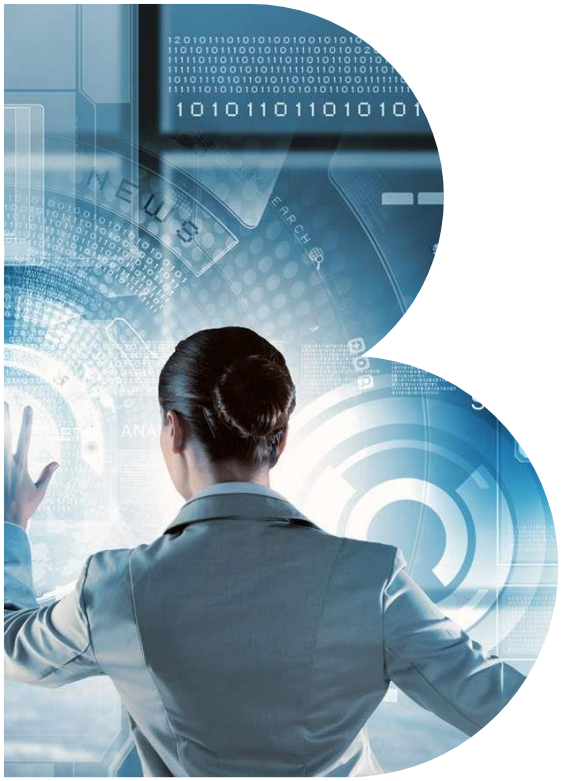
4 Automation



5 Green Technology

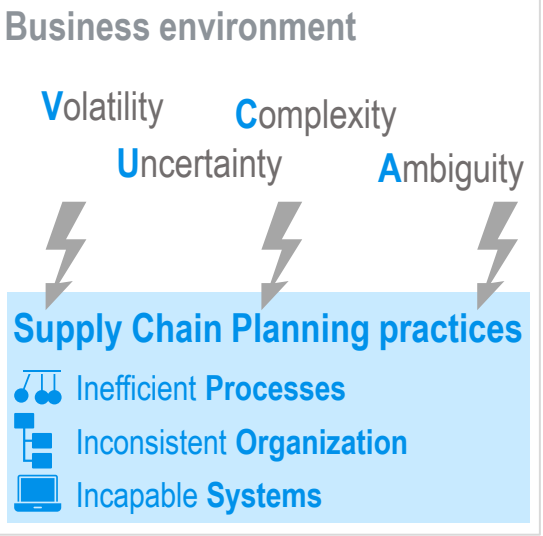
Source: Roland Berger

D. Digital Supply Chain Planning

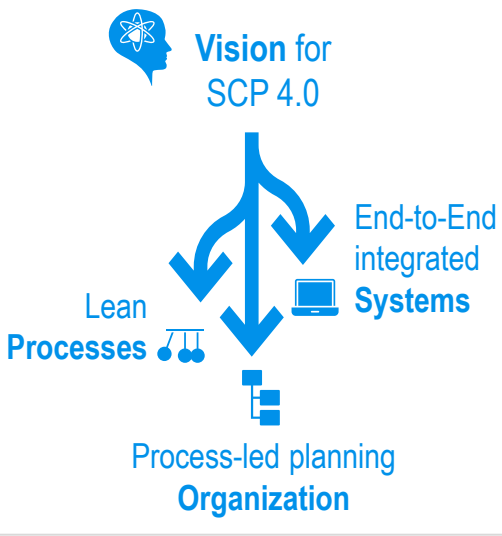


Supply Chain Planning (SCP) – Digitization and system integration promises significant benefits

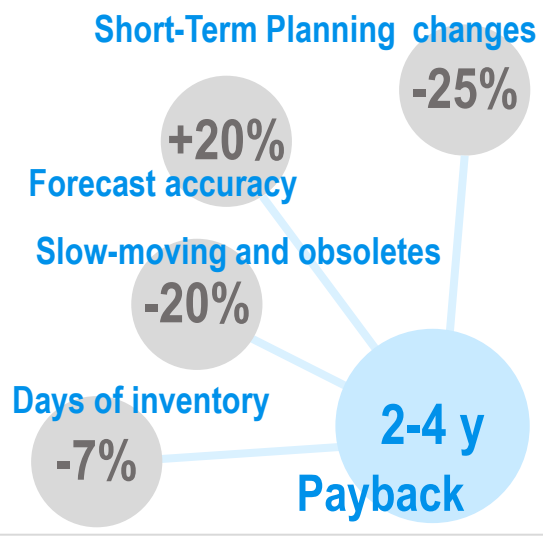
A Outdated SCP practices



B Future state of SCP



C Benefits[1)] of SCP 4.0



1) Variations may occur depending on the digital maturity of a company

Source: Roland Berger

Current SCP practices are not adapted anymore to the VUCA business environment, leading to operational inefficiencies

Misalignment between VUCA and SCP practices

VUCA business environment

Volatility
> Fast-changing consumer needs
> Shortening of production life-cycles

Uncertainty
> Globalization of demand and supply
> Financial pressure on margins
> Uncertain politics and regulations (e.g. Brexit)

Complexity
> Sophistication of technologies (e.g. Internet of Things, 3D printers, deep learning, etc.)
> Proliferation of SKU variants
> Overflow of consumer-related data

Ambiguity
> Fading boundaries between markets in the digital age
> Demand for tailor-made solutions

Operational inefficiencies in SCP practices

Process
> **Silo thinking** between production planning processes
> **Demand sensing/ forecasting**: No effective alignment between **demand** and **supply**
> **Manual** processes
> No **real time view** of supply chain
> No **standardized processes** and low adherence discipline

Organization
> **Heterogeneous** planning organizations
> High churn of planners and no-harmonized **incentive systems**
> No **strategic positioning of SCP organization** set-up

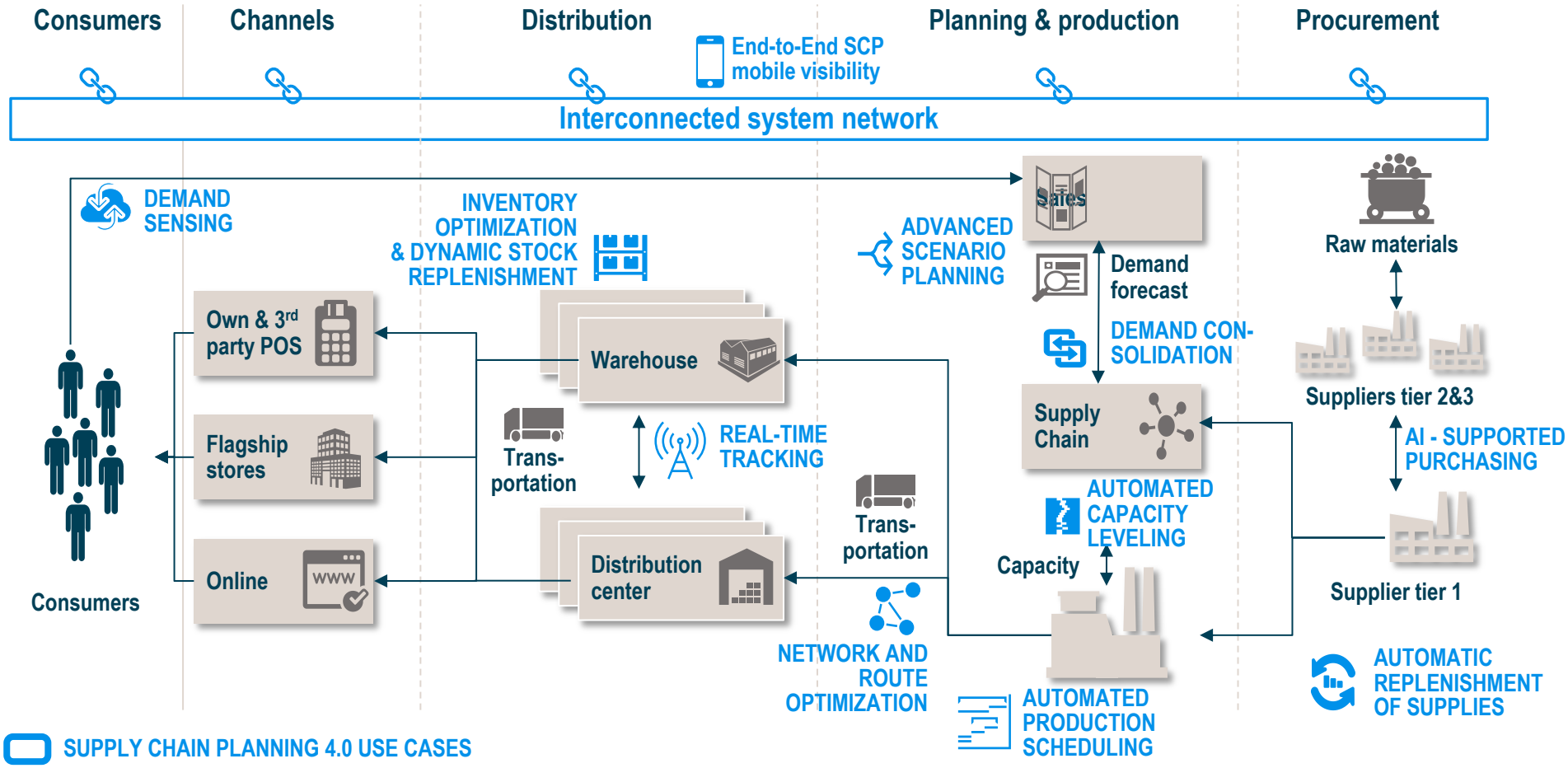
Systems
> **Different IT systems** and system breaks
> No overall **data integrity**, transparency and traceability
> Insufficient **system functionalities**

Source: Roland Berger

We foresee a best-in-class digital, optimized and interconnected landscape to drive the SCP transformation

Vision of the future Supply Chain

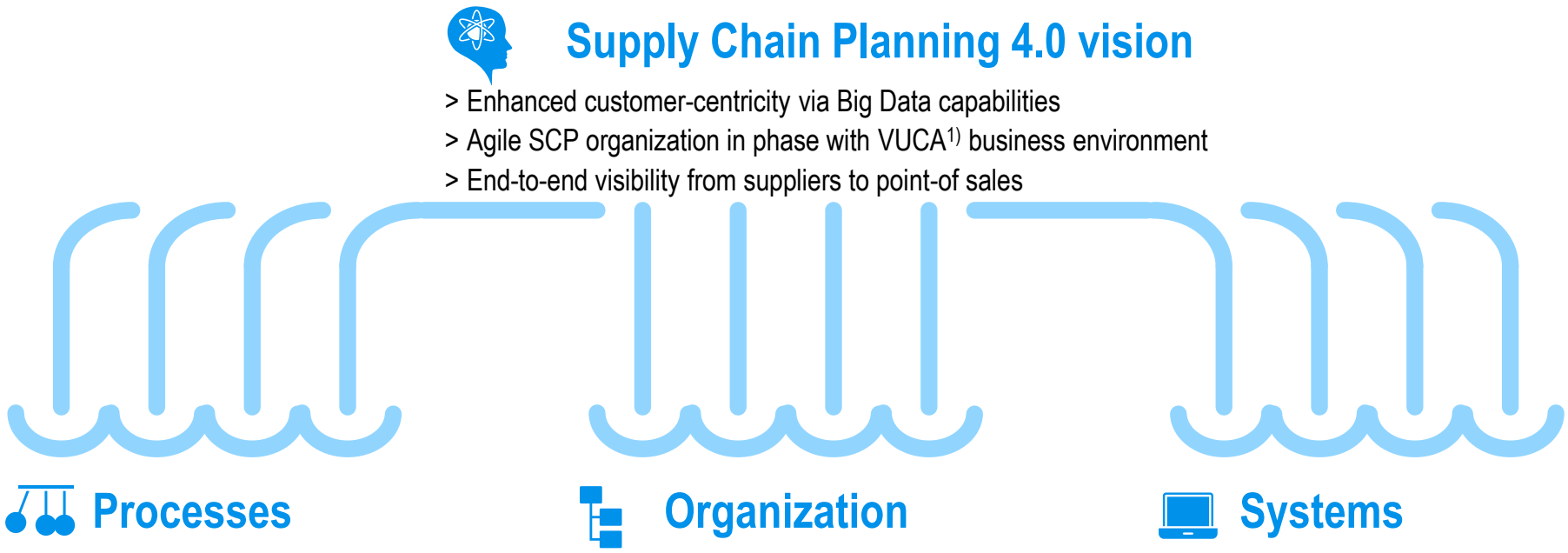
Illustrative



Source: Roland Berger

To underpin this change, the company's vision for SCP need to be defined to derive the future processes, orga. and IT system landscape

Supply Chain Planning of the future - Framework



1) Volatile, Uncertain, Complex, Ambiguous

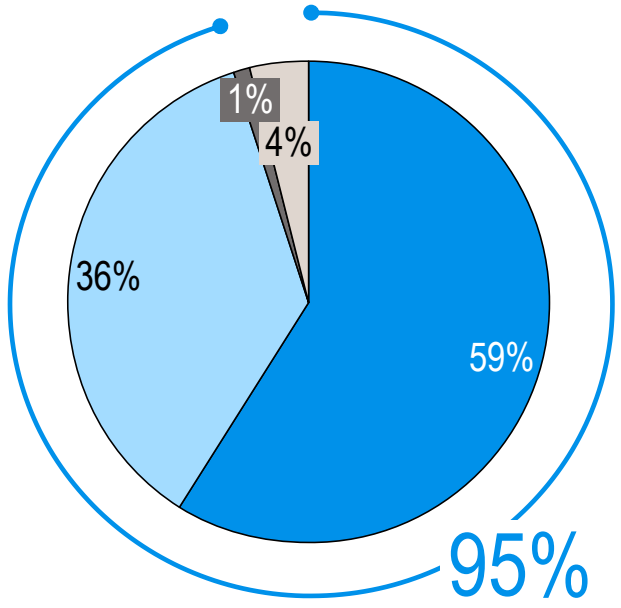
Source: Roland Berger

E. Digitization of LSP and Forwarders in particular

Online survey: almost 95% of participants share the opinion that digitization will partly or completely change their industry

Changes in the logistics industry caused by digitization

Digitization will change the industry...



…completely
…partly
…not at all
I don't know

> According to the vast majority of respondents, digitization will change the logistics industry completely (59%) or at least partly (36%) in the coming years

> Changes are possible in many areas and will especially affect market transparency and collaboration between different (new) market participants

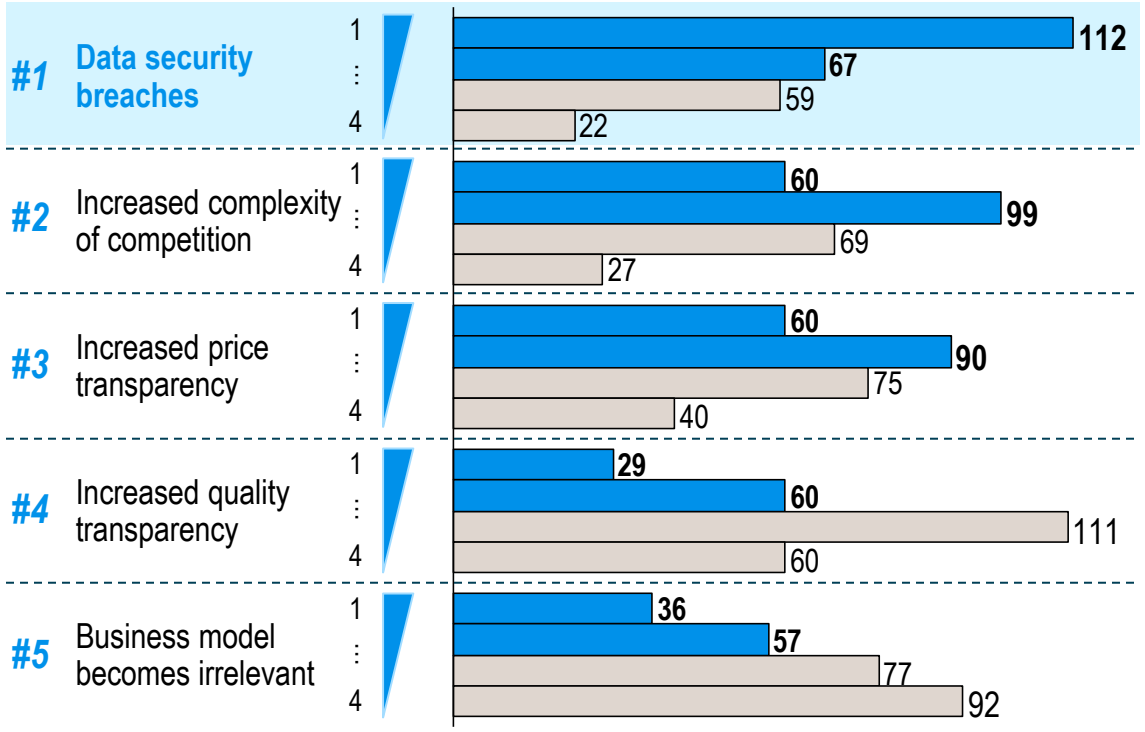
Source: Roland Berger online survey "2016 logistics study on digital business models" developed in cooperation with TU München

Online survey: Participants more concerned about data security than about disruption of current business models …

Risks of digitization

How could digitization threaten your business model?

Every option was assessed individually



1 – Big risk | 4 – No risk

- Data security is seen as a risk across all industries and company sizes
- Fully one third of participants believe current business models could become irrelevant
- Especially participants with a contract logistics background (~45%) and those from larger companies see this as a risk
- Numerous examples confirm disruption in other industries:
  - AirBnB vs. hotels
  - Uber vs. taxi companies
  - Expedia vs. travel agencies
  - Amazon vs. retail companies
  - Netflix vs. video rental stores

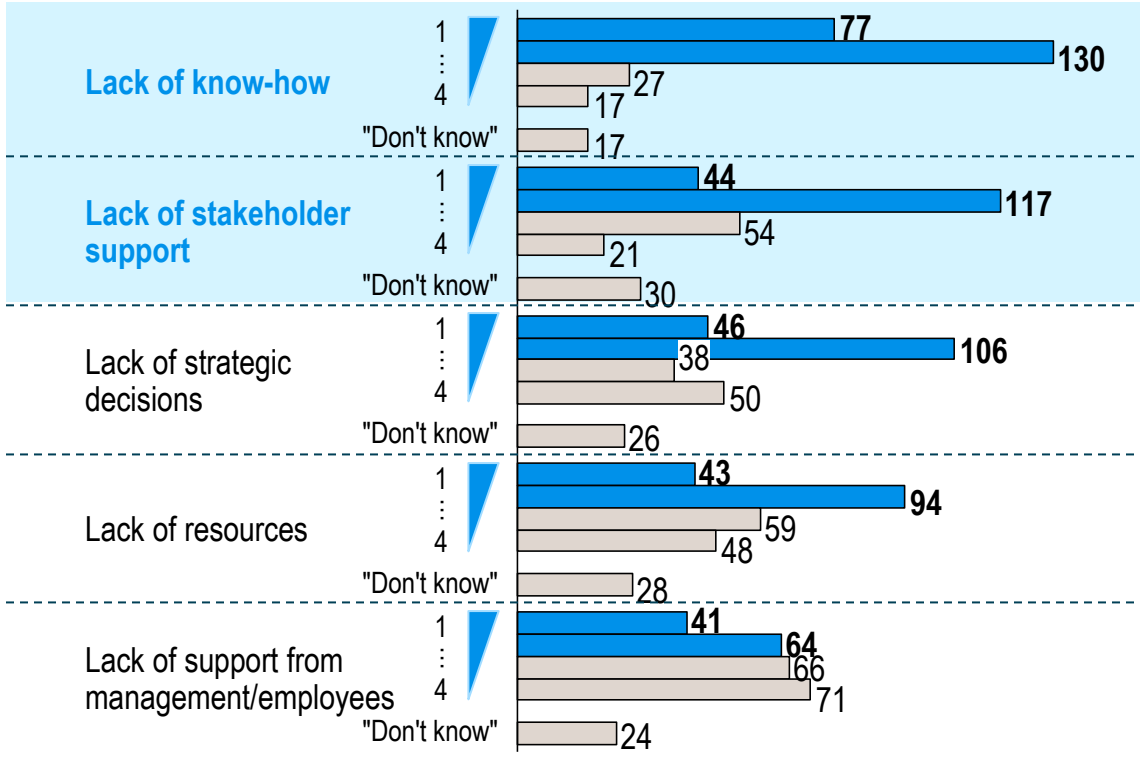
Source: Roland Berger online survey "2016 logistics study on digital business models" developed in cooperation with TU München

Online survey: despite high awareness, the major hurdle for change is lack of know-how and lack of stakeholder support

Challenges preventing from 'digital fitness'

What challenges do you face when …

… implementing digitization measures?



1 – Very big challenge | 4 – No challenge

> Small companies have to cope especially with a lack of resources, whereas bigger firms consider a lack of know-how and lack of support from management and employees to be a major factor impacting implementation

Source: Roland Berger online survey "2016 logistics study on digital business models" developed in cooperation with TU München

Hypotheses on 'digital end-games' leave only limited space for legacy forwarders

Surviving players in the logistics industry (endgame scenarios)

1 Booking & optimization platforms (BOP)

> Independent platform for the management of logistics transactions
> Route and cost optimization capabilities

2 Carrier, terminal operators, trucking companies (CTO)

> Asset holders and operators performing logistics tasks
> High asset and cost efficiency
> Either specialized or standardized

3 Supply chain specialists (SCS)

> Solution provider for complex or industry-specific tasks
> Deep understanding of industry-specific supply chains

4 Service providers (SP)[1)]

> New players, hardware providers and existing online players
> Provision of support services for logistics companies

New players in services (especially in BOP)

Stronger specialization of the players (asset-heavy vs. asset-light)

Profit pool shift away from the business of traditional freight forwarders

Increasing number of large freight carriers & trucking companies vs. supply chain specialists

1) Active in multiple industries

Source: Market experts, Roland Berger

Especially the 'commodity business' (low USP, high degree of standardization) will be subject to business model disruption

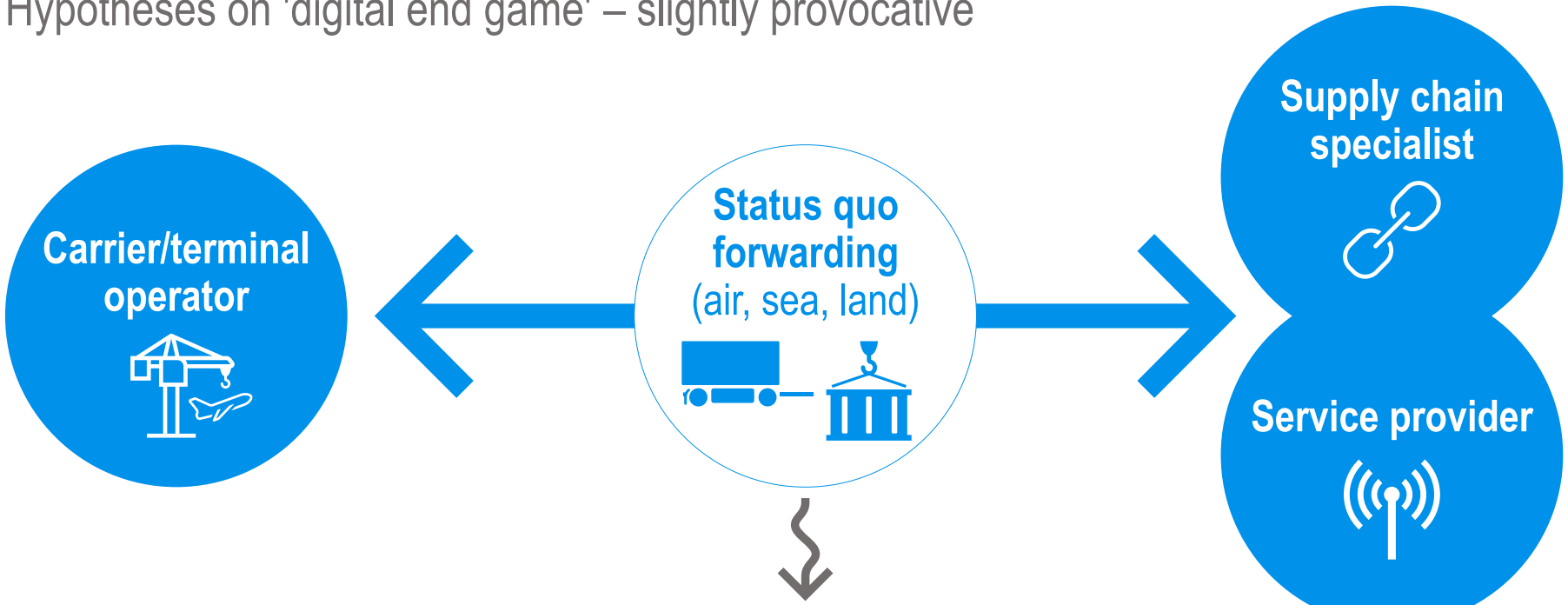
Market outlook – Driving forces of new business models

	Forwarding air/sea	Forwarding land	Contract logistics
Current share of standardized business (FTL, LTL, container)	~80%	~70%	<5%
	> Booking platforms are expected to attract most of forwarders' standardized business, aiming at grabbing their margin > As a result, forwarders' business models need to be transformed		> Demand for personalized products expected to grow > Supply chain specialists expected to offer product personalization > As a result, contract logistics market expected to grow ~9% p.a. > Digitization might boost growth as demand for tailored solutions increases

Source: Market experts, Roland Berger

Forwarders should rethink their portfolio into two directions: Focus on asset ownership & operation of focus on SCM and VAS services

Hypotheses on 'digital end game' – slightly provocative



Challenges

> Cost efficiency will be key

> Financing will be a challenge

Challenges

> Business transformation and IT development will require sufficient financing

> Cost base to be efficient to increase operational CF

Based on research and interviews, different platform types can be distinguished – Different functions and foci

Statements on Business optimization platforms

> **Platform** foci are **diverse**; the field is not yet fully sorted

> **Upcoming structure of platforms** might be clustered into (1) Legacy solutions, (2) Tender platforms, (3) Carrier distribution systems, (4) Freight exchange broker platforms and (5) virtual forwarders supported by instant quote service providers:

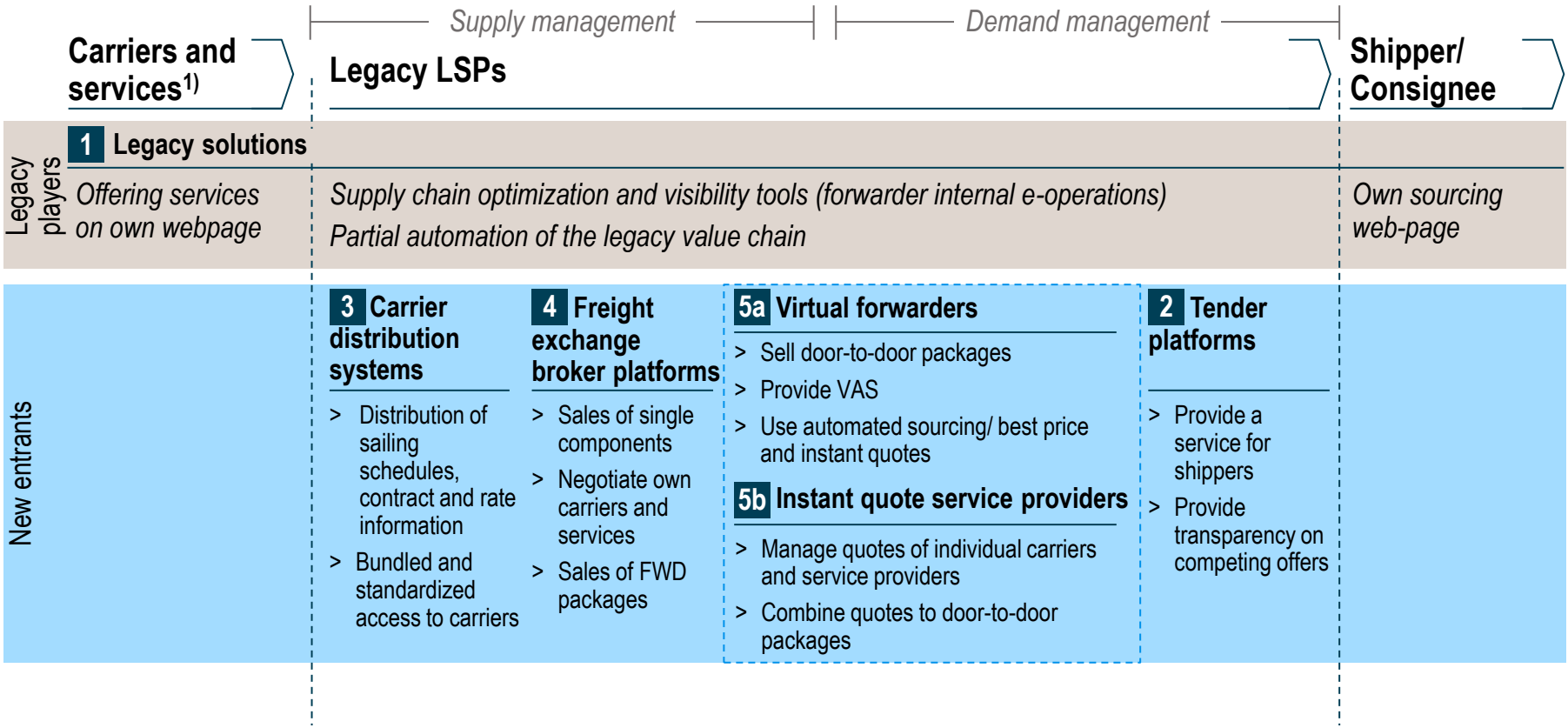
- **Tender platforms** provide a service for shippers and provide transparency on competing offers
- **Carrier distribution systems** collect and manage carrier and service provider information as well as capacity in a central system
- **Freight exchange broker platforms** sell single components, but negotiate own carriers and services
- **Virtual forwarders** automatized their sourcing process and provide value added services to the shipper
- **Instant quote service providers** manage quotes of individual carriers/ service providers and combines quotes to door-to-door packages

> All models might have a sustainable value proposition and might **diminish** the position of **legacy forwarders**

Source: Roland Berger

'Virtual forwarders' and 'dynamic production models' are about to come – legacy forwarders will lose market share

Joint study result – Future platforms in forwarding



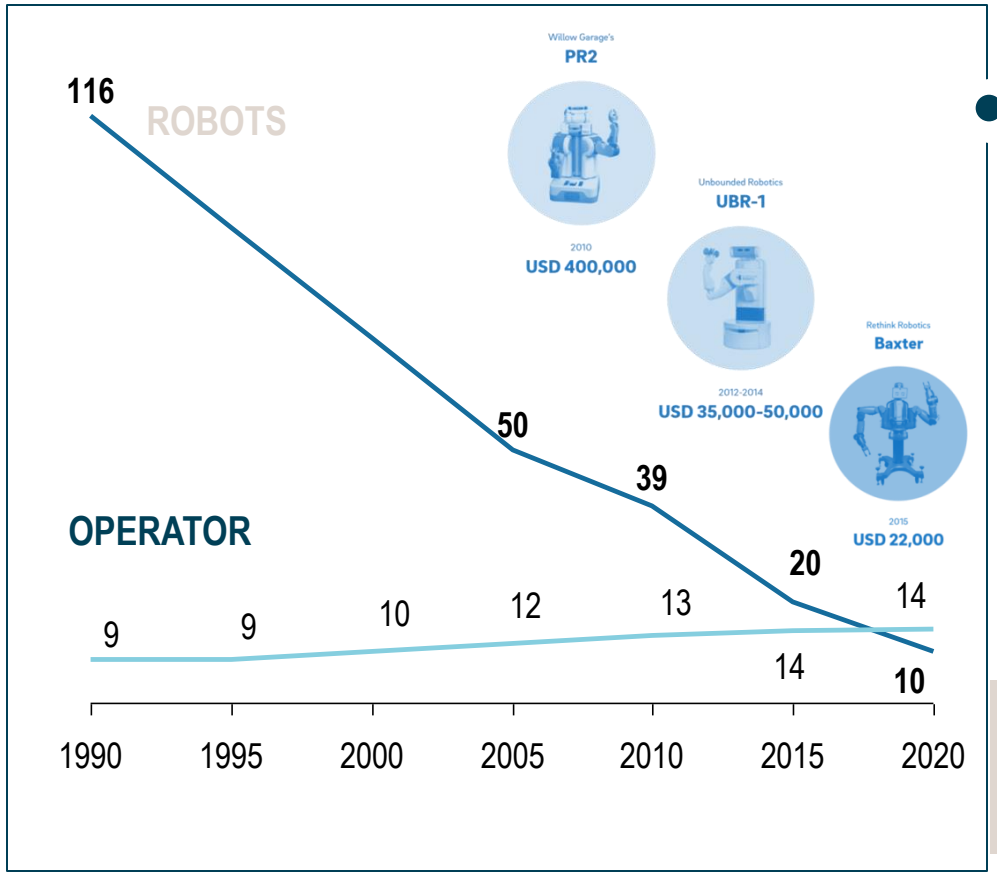
1) Including warehousing, customs clearance, trucking etc.

Source: company websites, Roland Berger

F. Robotics and automation in logistics

Robots are becoming affordable – In many cases, robots are becoming cheaper than human operators (example: Netherlands)

Hourly minimum salary in Netherlands vs. hourly costs of robots [EUR/hour]



Major cost impact drivers

- Increase in the length of the lifespan of robotic solutions
- Drop in robotic equipment prices
- Increase in the productivity of robotic solutions
- Continuous rise of labor costs

Resulting in an ROI of less than 3 yrs. for many robotic solutions

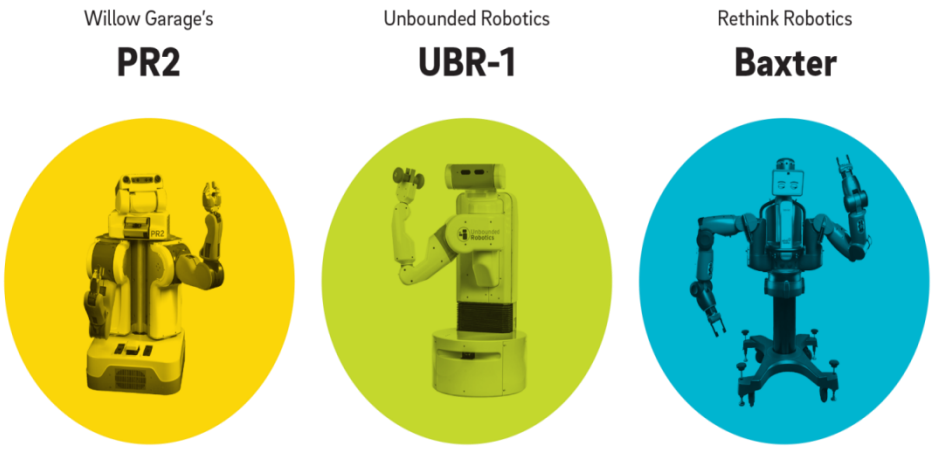
Source: IFR; INSEE; Eurostat; gemiddeld-inkomen.nl; Companies; Roland Berger study

The mass arrival of robots in logistics is no longer a question – the real question is how soon and how to better prepare for it

ROBOTIC SOLUTIONS

Though solutions are not entirely comparable, their price evolution highlights the change in the scale of robotics solutions designed for order-preparation operations.

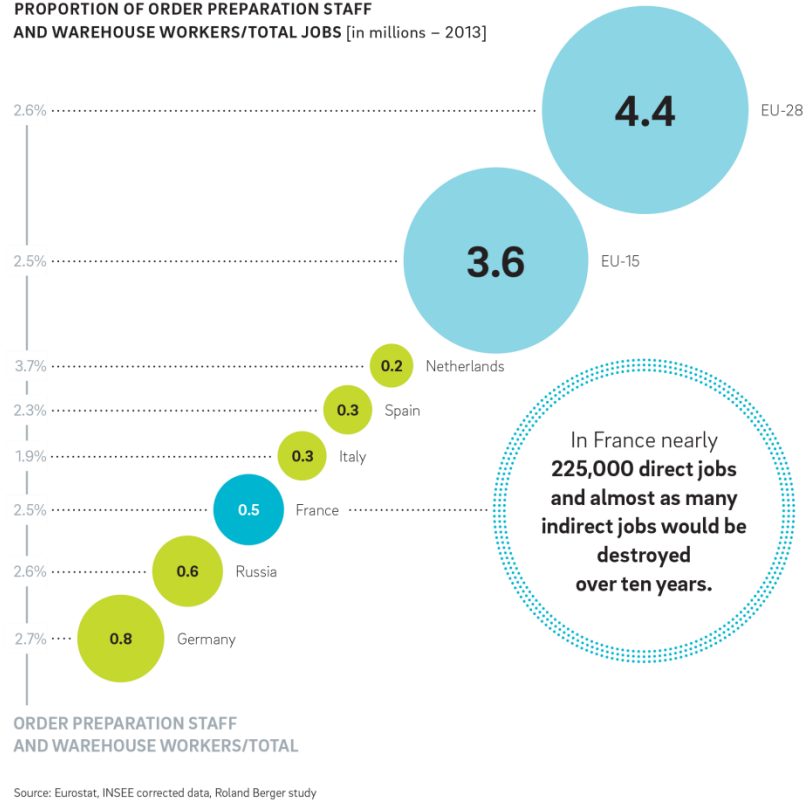
EXAMPLE OF THE PRICE EVOLUTION OF LOGISTIC ROBOTS



IMPACT ON EMPLOYMENT

The comparison between logistic and automotive robotics reveals that a little over 1.5 million direct jobs (40%) would be destroyed in the Eurozone over the next ten years.

PROPORTION OF ORDER PREPARATION STAFF AND WAREHOUSE WORKERS/TOTAL JOBS [in millions – 2013]

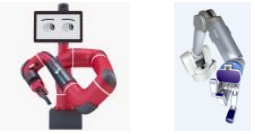


Source: Eurostat, INSEE corrected data, Roland Berger study

Source: Roland Berger

Robots are moving "downstream" in logistics – Robotic developments in order picking and delivery are taking off

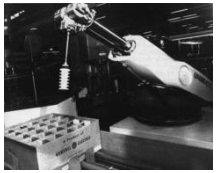
Robotization in the logistics sector

	Handling	Transport	Warehousing	Order picking	Delivery
Stationary robots	*Packaging*	*Automated container handling*	*Automated storage and retrieval*	 *Automated order picking*	
Automated guided vehicles		*Automated truck/ship delivery*	*Automated forklift*	*Moving shelves*	*Delivery vehicles*
Drones			*Surveillance/ monitoring drones*	*Inventory drones*	*Delivery drones*
Maturity of robotization	◕	◑	◕	◔	○

Source: Company website; Roland Berger

Robots are becoming more intelligent – Robots can handle more complex tasks in less controlled and less predictable environments

Development of robotic solutions



1960

First industrial robot

> Spot welding

> Extracting die castings

1970

Small part assembly robots

> Feedback from touch and pressure sensors

> Arm controlled by a minicomputer

1980

Direct drive arm robots

> Motors installed directly into the joints of the arm

> Faster and much more accurate handling

1990

2000

Handling robots

> Part selection, transferring, packing, palletizing, loading and unloading, machine feeding or disengaging

> Controlled and structured environment

2010

Today's robots

> Lightweight & easier to relocate

> Work in semi-structured environments

> Collaborative human-robot working environment

2020

Future robots

> Amazon picking challenge: autonomous picking objects in unstructured setting: different shapes, colors, sizes and positions

> Use of 3D camera with visual recognition

> At-home delivery by AGV or drone

Traditional large market players

KUKA ABB NACHI MOTOMAN A YASKAWA COMPANY FANUC

Start-ups & research initiatives

Swisslog (KUKA)

YuMi® ABB

Baxter Rethink

Delft Robotics

Magazino (Siemens)

KIVA (Amazon)

Matternet (Mercedes)

Bastian

(x) shareholder/owner

Source: Manufacturers

Roland Berger