



# Digitalization and trends in beer logistics: Current status and outlook

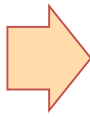
Dr. Josef Fontaine (CEO at VLB Berlin e.V.)

# Content of the lecture

- + Introduction
- + Basics: Digitalization, Digital Transformation and Disruptive Innovation
- + Current Trends Digitalization & Technology
- + Current Trends in Beer and Beverage Logistics
- + Outlook and Summary



# Classic Beer and Beverage Supply Chain (Push)



## Suppliers

- Malt
- Hops
- Packaging

## Brewery

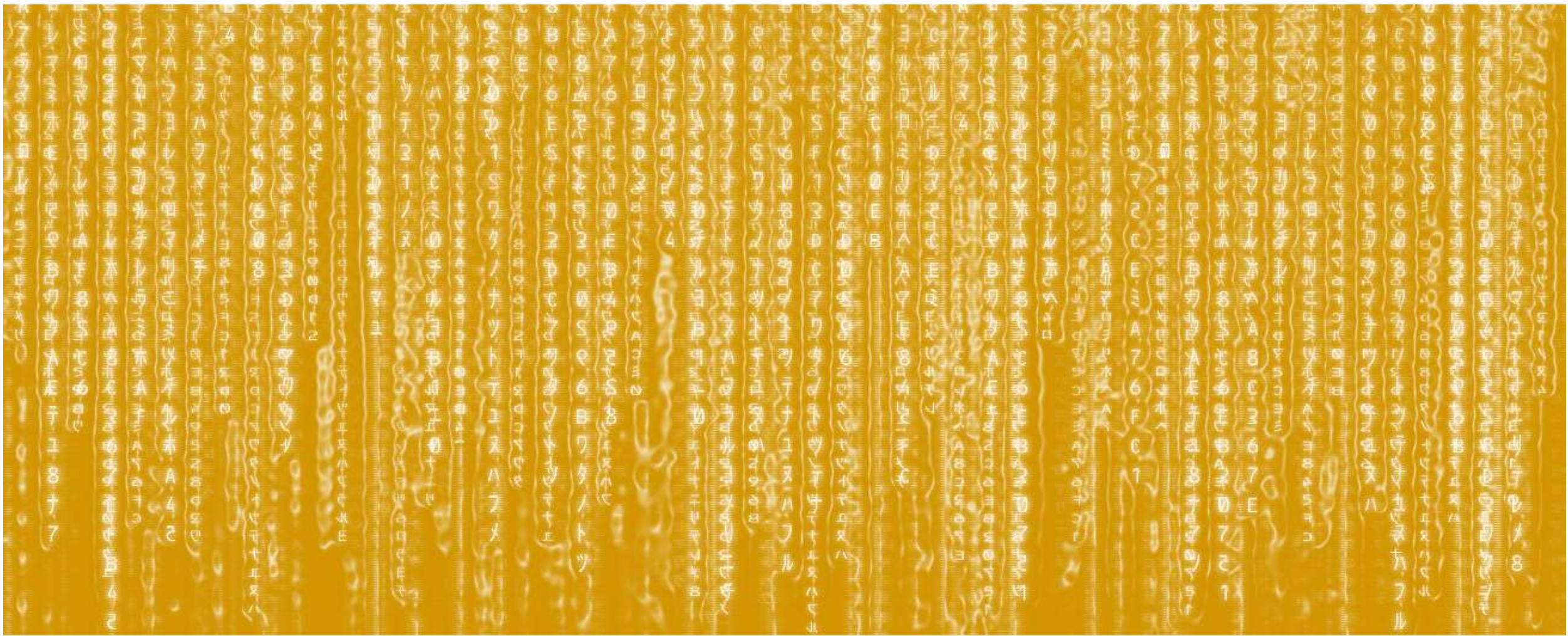
- Beer
- Bottle/Can
- Keg

## Trade

- Whole sale
- Retail
- Pubs/Event

## Consumer

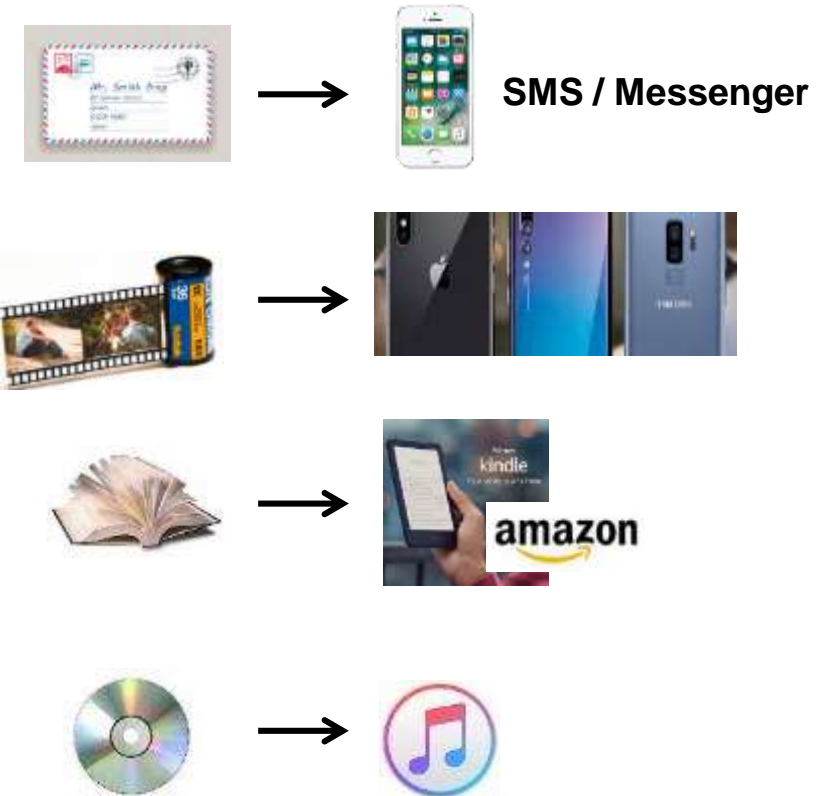
- At home
- Out of home



# Digitalization, Digital Transformation & Disruptive Innovation

# What means Digitalization & Transformation?

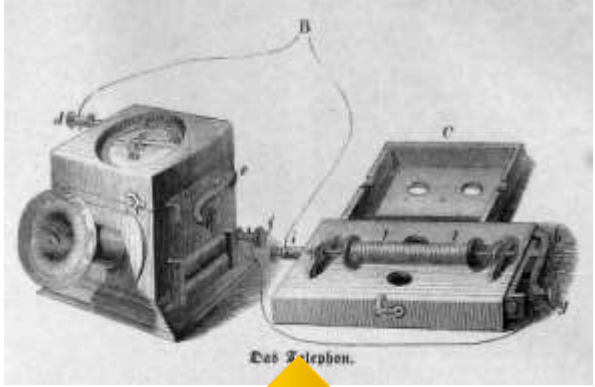
- + Digital Transformation is the **novel use of digital technology** to solve traditional problems. These digital solutions enable inherently new types of innovation and creativity, rather than simply enhance and support traditional methods.
- + In a narrower sense, "digital transformation" may refer to the concept of "going paperless" or reaching a "digital business maturity" affecting both individual businesses and whole segments of society, such as mass communications, government, art, medicine, and science.
- + **Disruptive Innovation:** *A process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors.*



# Disruptive Innovation ... nothing new!

Pony-Express:  
 Mail from Atlantic to Pacific coast  
 in **only 10 days**

Telegraphy & Telephone



# (Disruptive) Innovation

Former times:

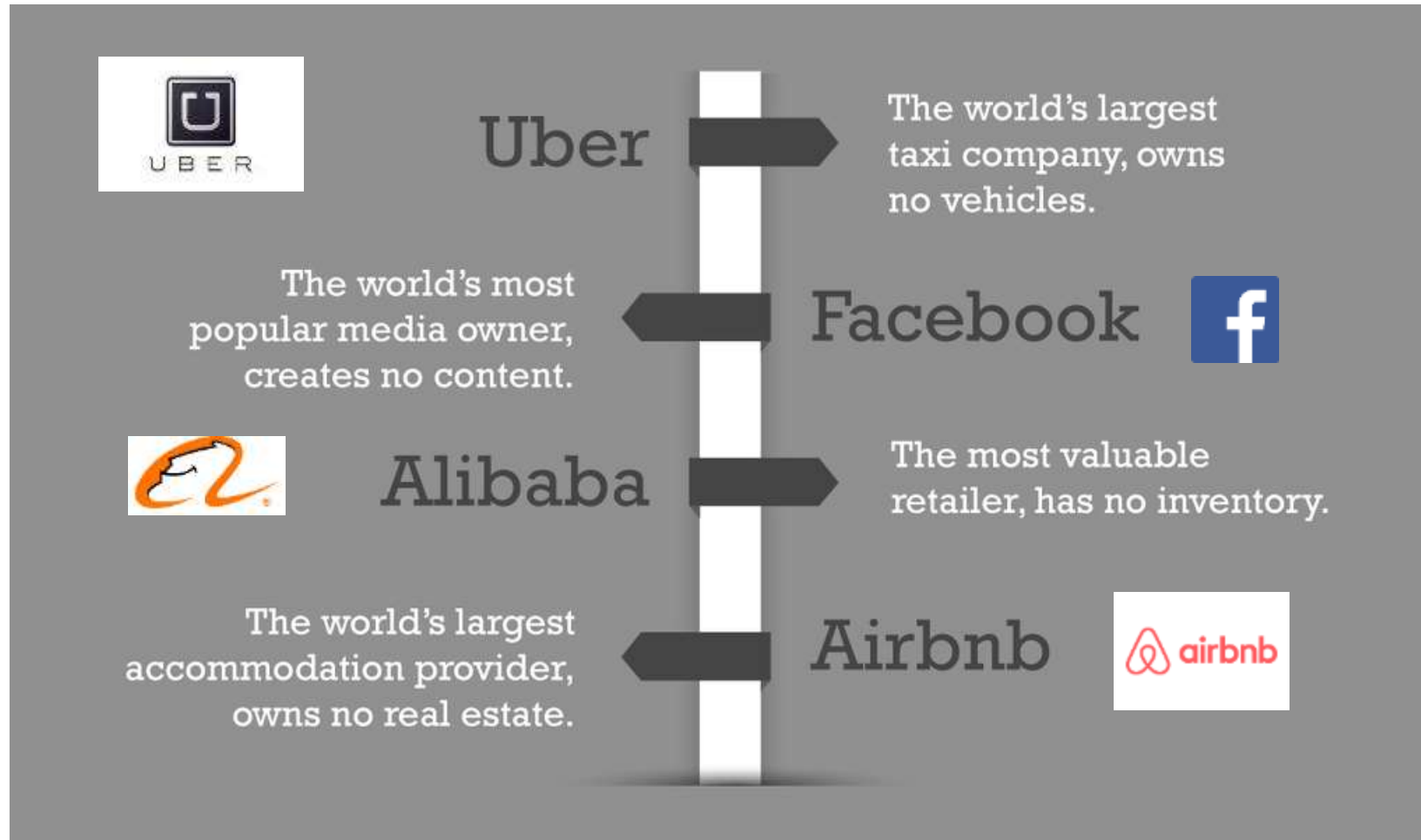


Today:

- Digital menu
- App-Order
- Smartphone-Navigation
- Mobile Payment



# Typical Digital Business Models



Source: Wetpaint



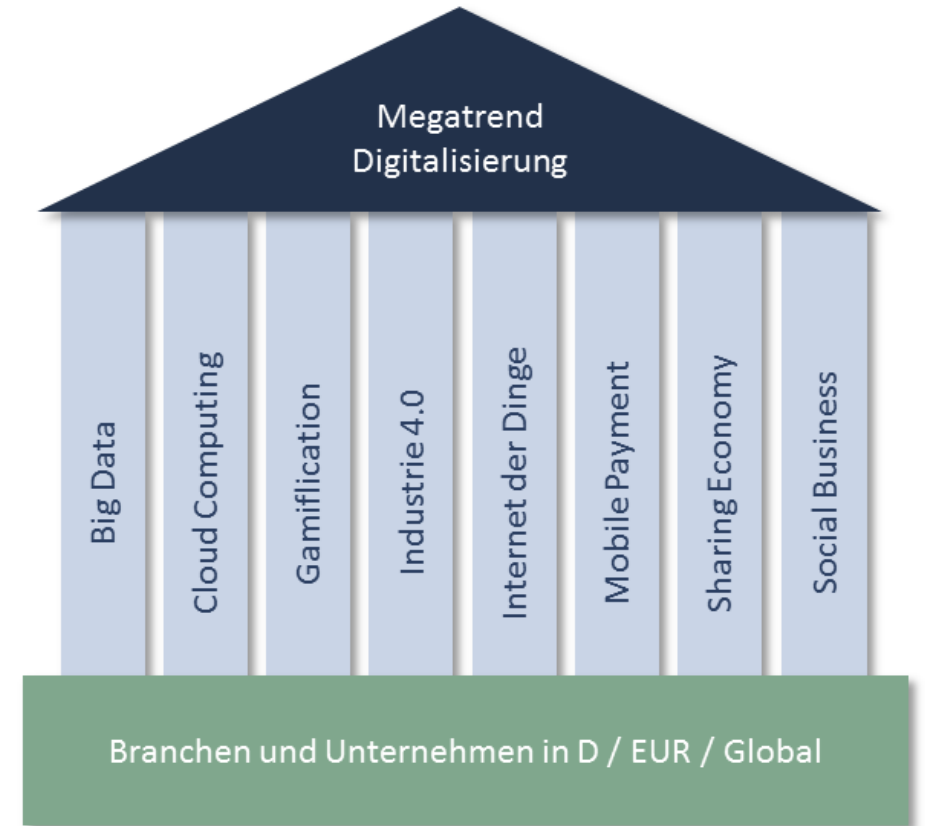
# Brewing and selling beer is NOT a digital business!

- + Beer is a physical product.
- + Physical products can not be digitalized or be converted in data.
- + But **all information** that come along with production, distribution and consumption of beer can be collected as digital data.
- + More and more **processes** can be automated with new technologies that were not available some years ago.

# Introduction - Digitalization & Digital Transformation

## 8 major technology trends determine the D-Era

- + Mobile computing
- + Cloud computing
- + Internet of Things
- + Big Data
- + Industry 4.0
- + Sharing economy
- + Gamification
- + Social business

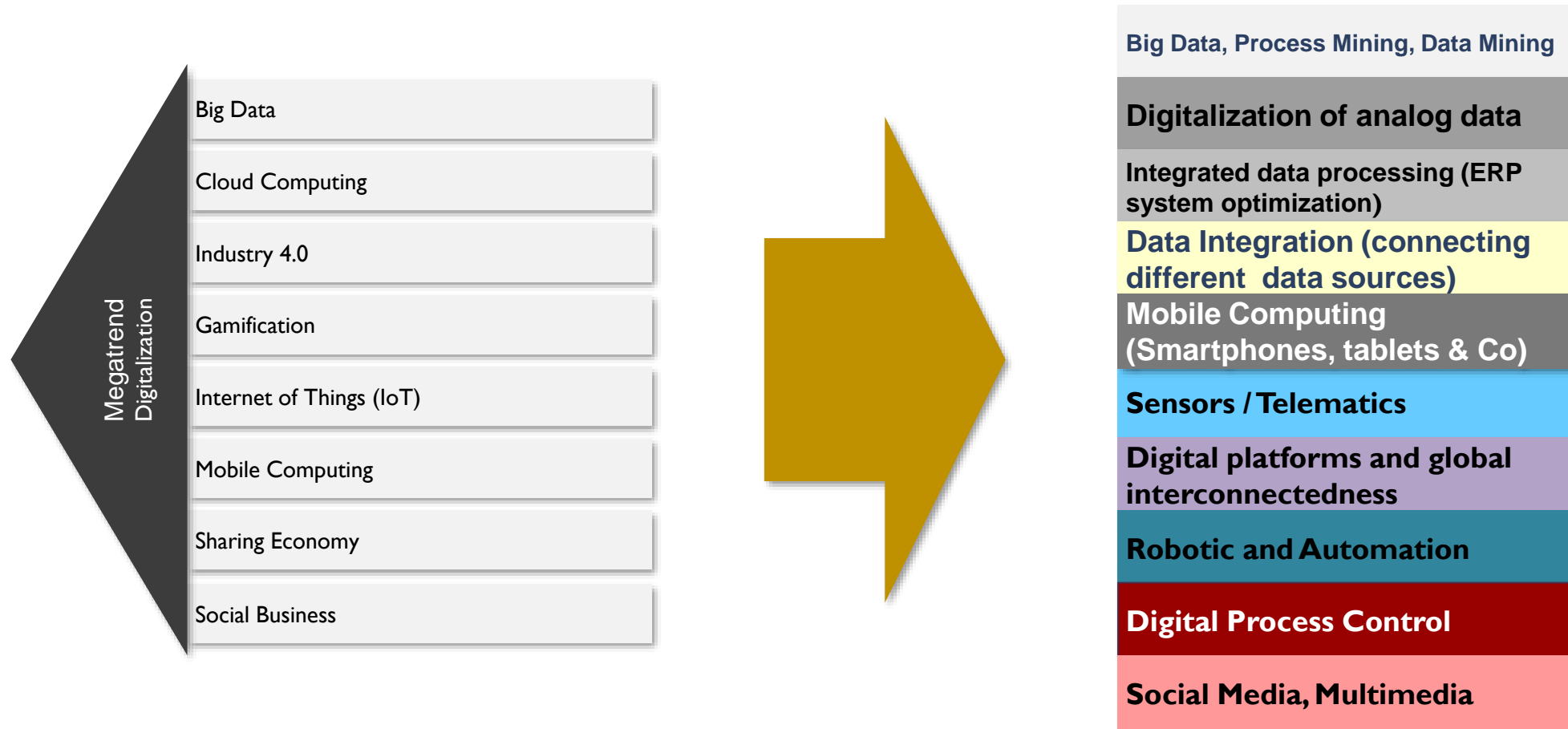


Quelle: Digitalisierung – Disruptiver Megatrend oder evolutionärer Treiber? DHBW Juni 2015

Source: Exxent Consulting in the download center on [www.exxent.de](http://www.exxent.de)

# Introduction - Digitalization & Digital Transformation

The technological dimension of transformation:  
10 concrete building blocks of digitalization - from jungle to opportunity

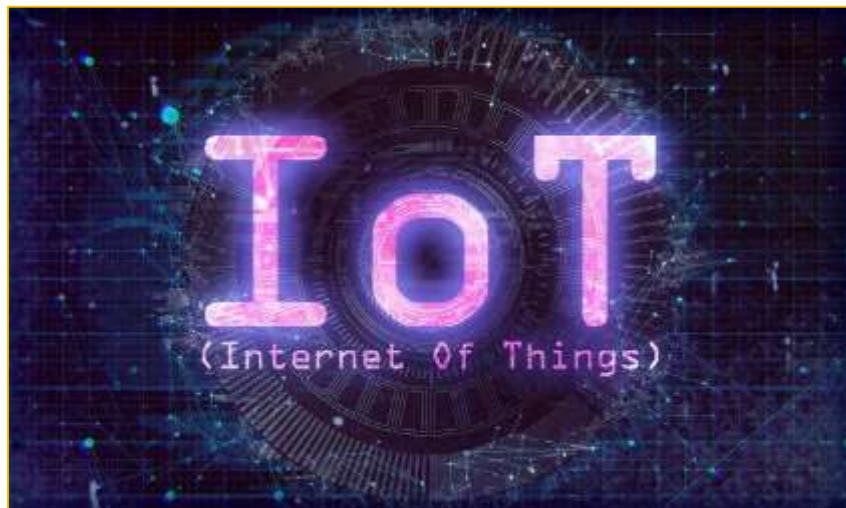


Source: Exxent Consulting in the download center on [www.exxent.de](http://www.exxent.de)



# Current Trends Digitalization

# Trend: Digitalization of Objects and Things - IoT



# Trend IoT: Embedded and Ubiquitous Computing

## Very cheap and small computer systems:

- Mini PC – intel + Win10 (99,99 €)
- Raspberry Pi (45,00 \$ US)
- Arduino Rev3 SMD (19,00 €)
- ... and many other (open source) systems



Sources (April 2019): <https://www.amazon.de/> <https://de.aliexpress.com> <https://store.arduino.cc>

# Trend IoT: Mobil Devices / smart devices



Smart Devices



Smart watch for logistic processes

# Trend IoT: Automatic identification of smart objects



One RFID STAR receiver controls many eNodes (up to 512 pcs.)



„eNodes“ activated in sequence  
4 external UHF Aerial per eNode



[www.mojix.com](http://www.mojix.com) Photos: Rewe

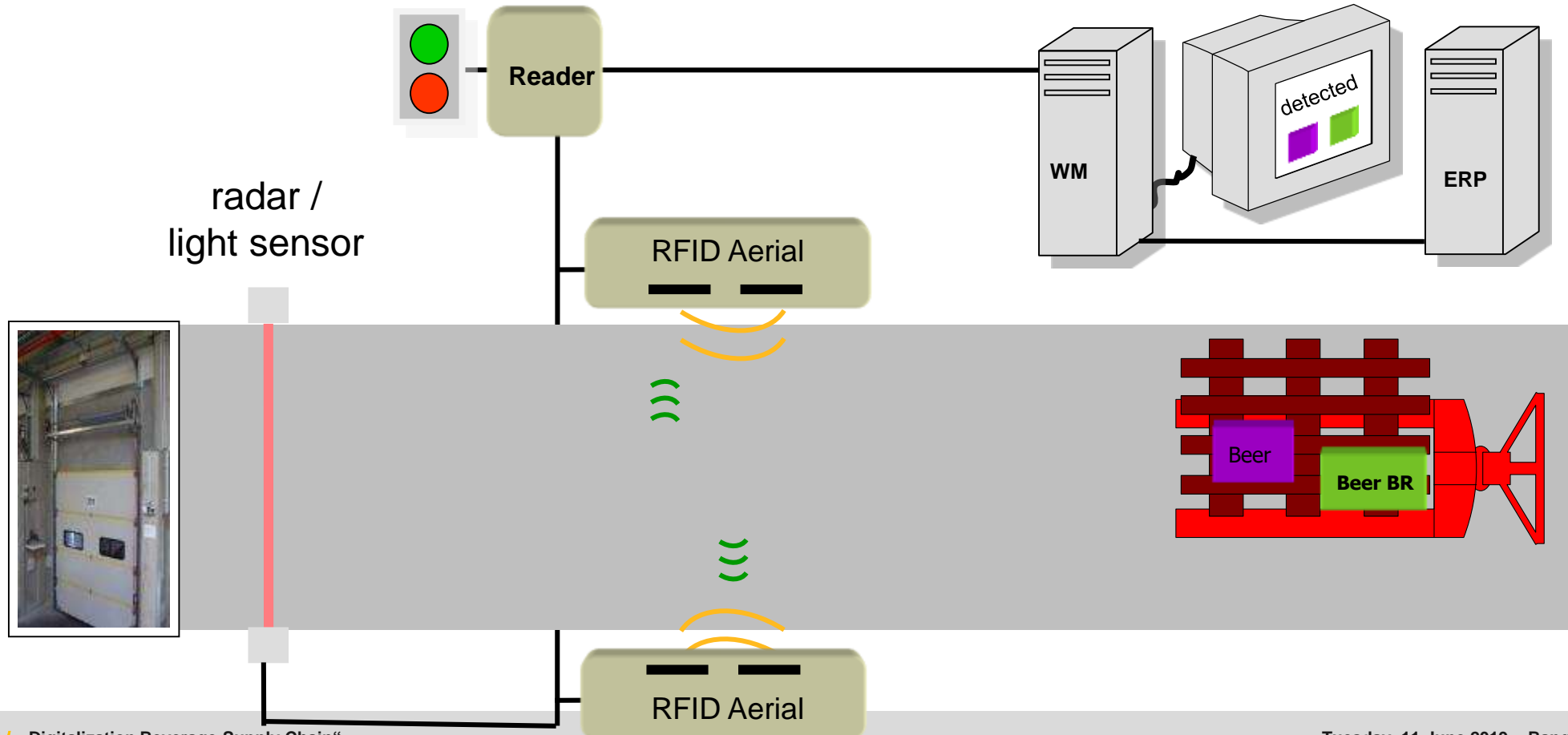


# Trend IoT: Automatic identification of smart objects – RFID

## How does RFID work?

- Reader sends energy
- Tag is activated by energy
- Tag sends data to reader
- Reader receives data and send it forward to computer system

Data structure and content is standardized and compatible to EAN128



# Trend IoT: Automatic identification of smart objects

## Low Power Wide Area Network (LPWAN)

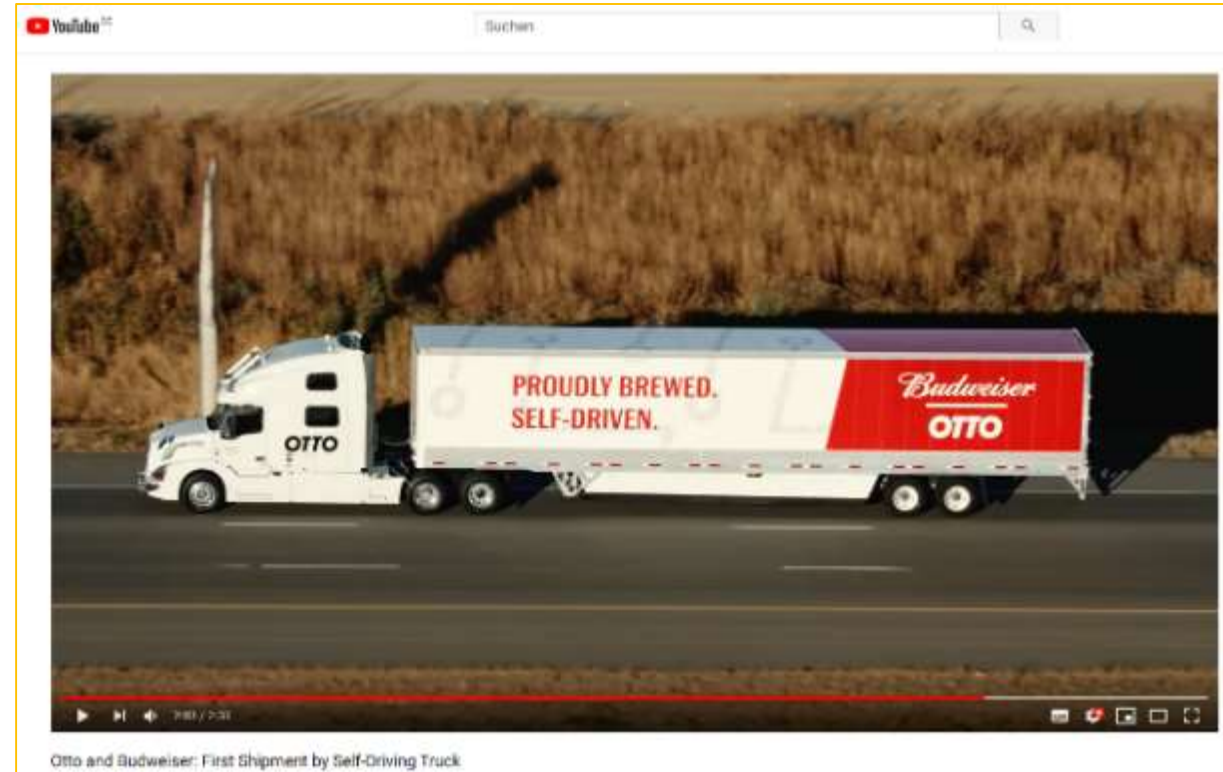
- LoraWan
- Narrowband-IoT
- Sigfox
- Etc.



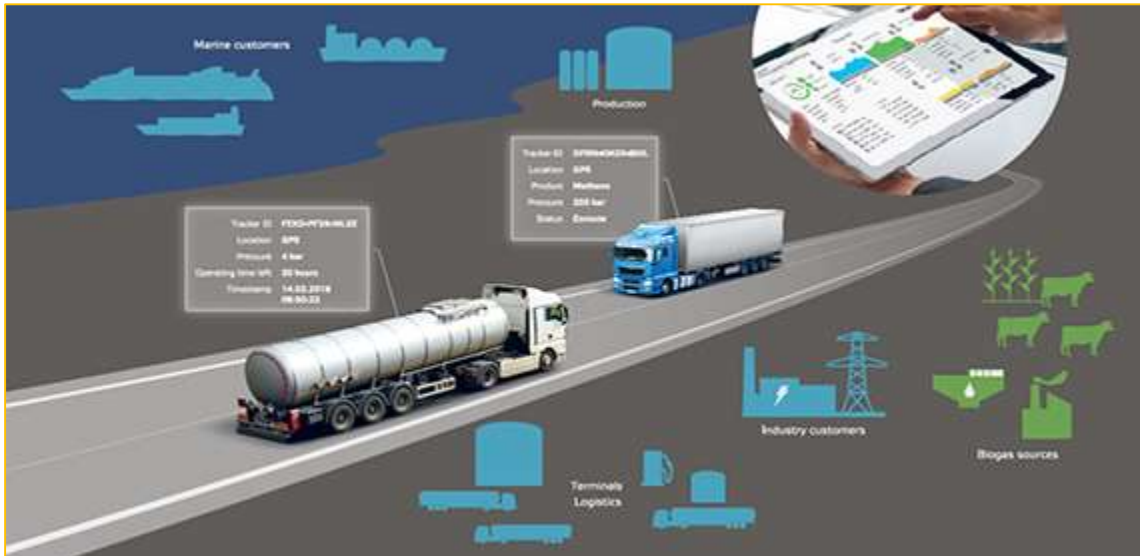
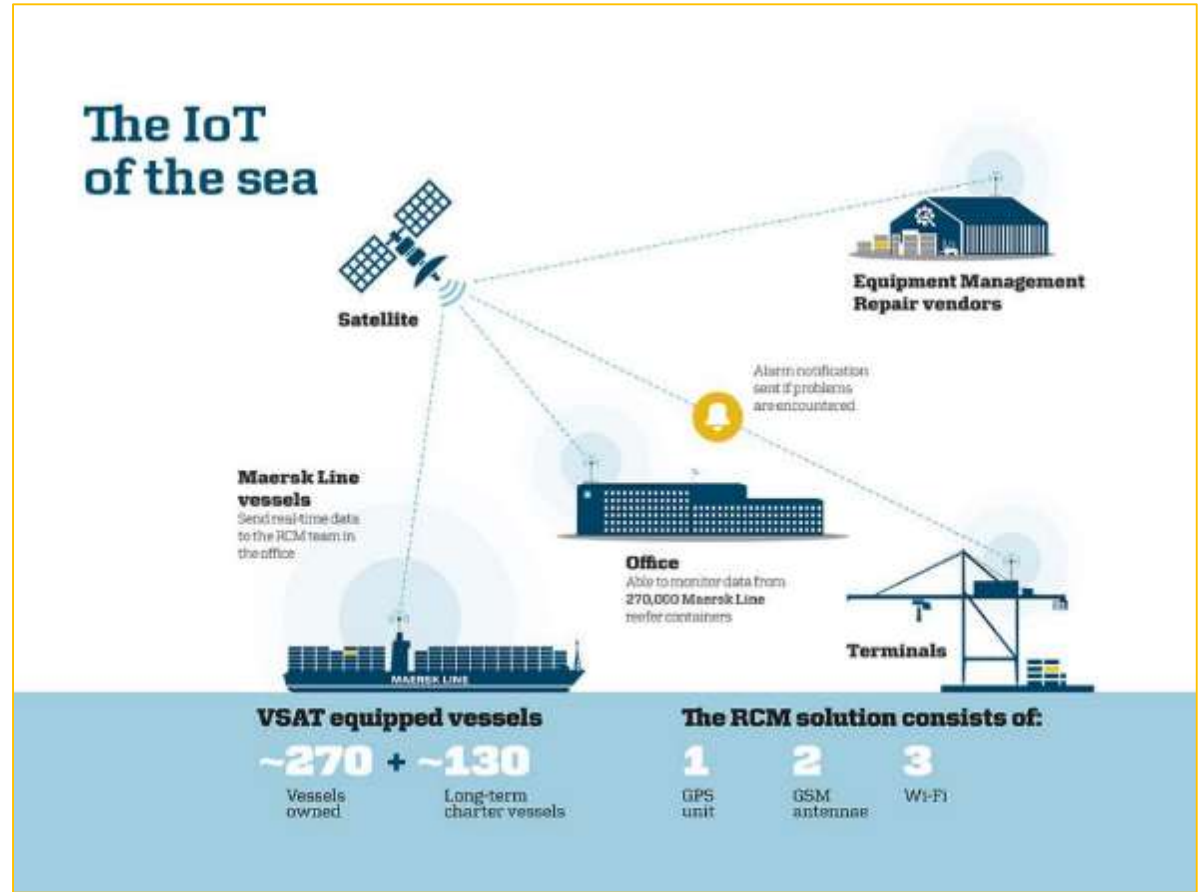
Source: Grotemeir BVL.digital

# Trends IoT: Autonomous Vehicle

<https://www.youtube.com/watch?v=Qb0Kzb3haK8>



# Trend IoT: Intelligent Container



Sources: biba-Bremen / searates.com / maersk.com / valmet.com

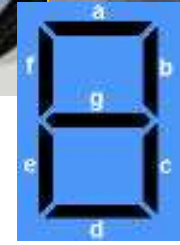


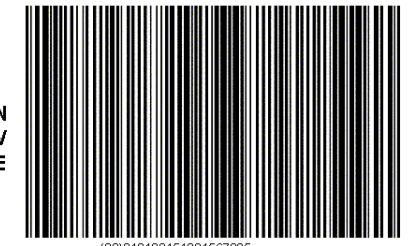
# Current Trends in Beer and Beverage Logistics

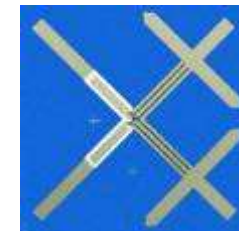
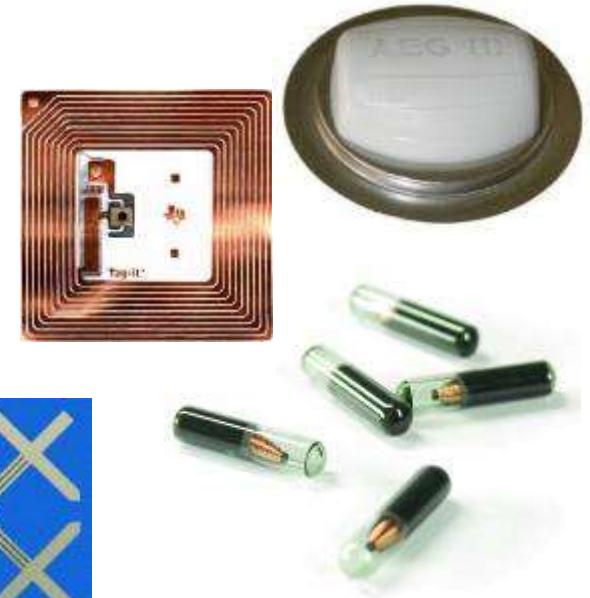
# Automatic identification of objects and things

(like: bottles, kegs, crates, cartons, palettes, ...)

- Barcode (EAN 8; 13; 128)
- 2D-Code (Data matrix / QR Code)
- OCR / 7-segment code (datix plus)
- RFID-Transponder (EPC)



		Absender: <b>BIERBRAU GmbH</b> Mollweg 1 13007 Berlin	
<b>NVE: 3 4012345 123456789 5</b>			
Enthaltene EAN: 04012345 12345 6		Menge (St./Pal.): 40	
Artikel: Pils 24x0,33	May 2020	Chargennummer: B0428809	
			
<small>(02)04012345123456(37)40(15)050414(10)B0428809</small>			
			
<small>(00)340123451234567895</small>			



# Automatic identification of objects - Barcode

## Information on palette label:

Serial shipping container code (SSCC)

Global trade item number (GTIN)

Amount of GTINs

Item / Article name

Date of best use

Batch number

Information can be read by human eye and machine readable by barcode

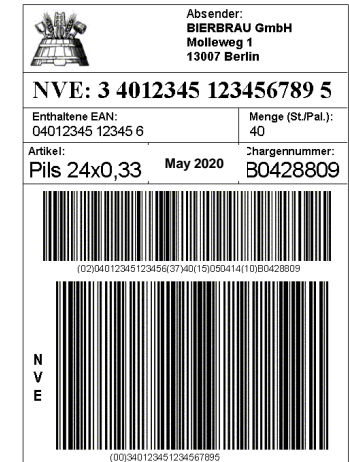
		Absender: <b>BIERBRAU GmbH</b> Molleweg 1 13007 Berlin	
<b>SSCC 3 4012345 123456789 5</b>			
Enthaltene GTIN 04012345 12345 6		Menge (St./Pal.): 40	
Artikel: <b>Pils 24x0,33</b>	MHD: <b>May 2020</b>	Chargennummer: <b>B0428809</b>	
			
(02)04012345123456(37)40(15)050414(10)B0428809			
			
SSCC (00)340123451234567895			

# Automatic identification of objects - Barcode

## GS1-128 Application Identifier Standard

### Transport label for

- palettes &
- displays units



### To execute:

- incoming- & outgoing goods
- picking
- traceability
- inventory



Bilder: Eckes & Flens



# Automatic identification of objects – RFID

RFID can be used for identification of **returnable beverage packaging**



[www.aegid.de](http://www.aegid.de)

# Use of RFID technologies for Digitalization

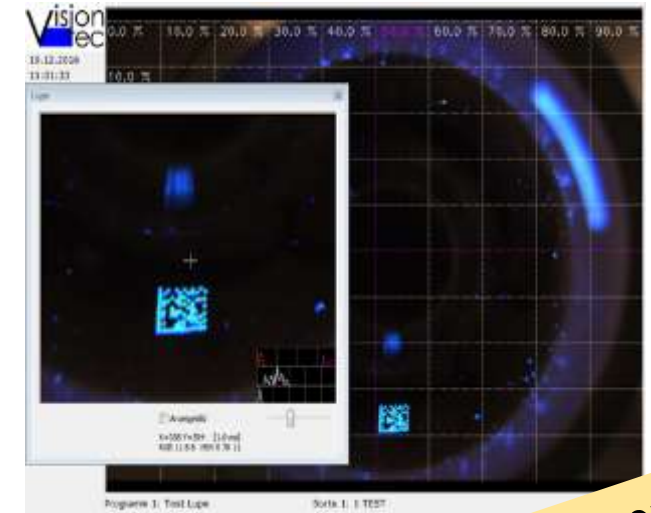
## RFID for the identification of:

- + ... Barrels and kegs
- + ... Returnable crates and trays
- + ... Pallets and load carriers



# Use of 2D-Code technologies for Digitalization

- + Identification of returnable bottles via Data Matrix Code (DMC)
- + ...



Current research project  
of  
VLB Berlin

# Container and product tracking

## VLB Project: Supply Chain Sensor Check



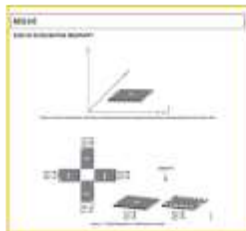
Temperatur- und Luftfeuchtesensor



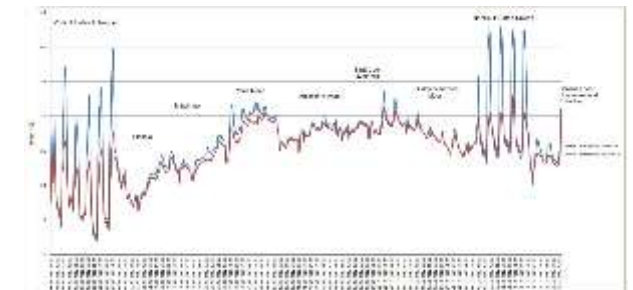
Luftdrucksensor



3-Achs-Beschleunigungssensor



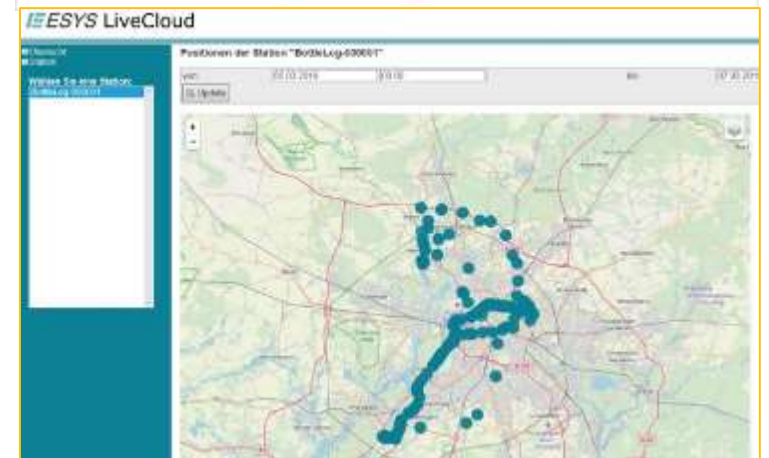
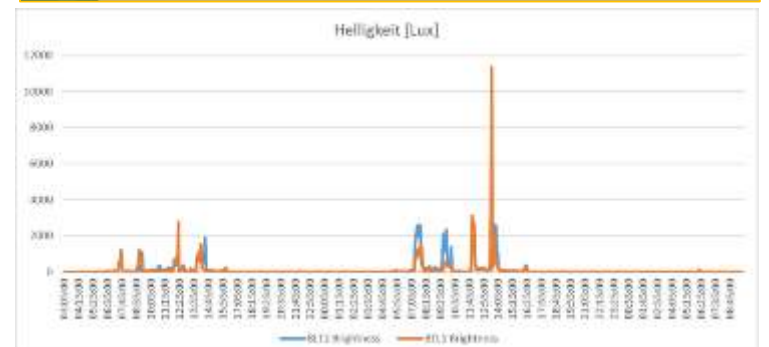
Lichtsensor



# Container and product tracking



## VLB Project: BottleLOG



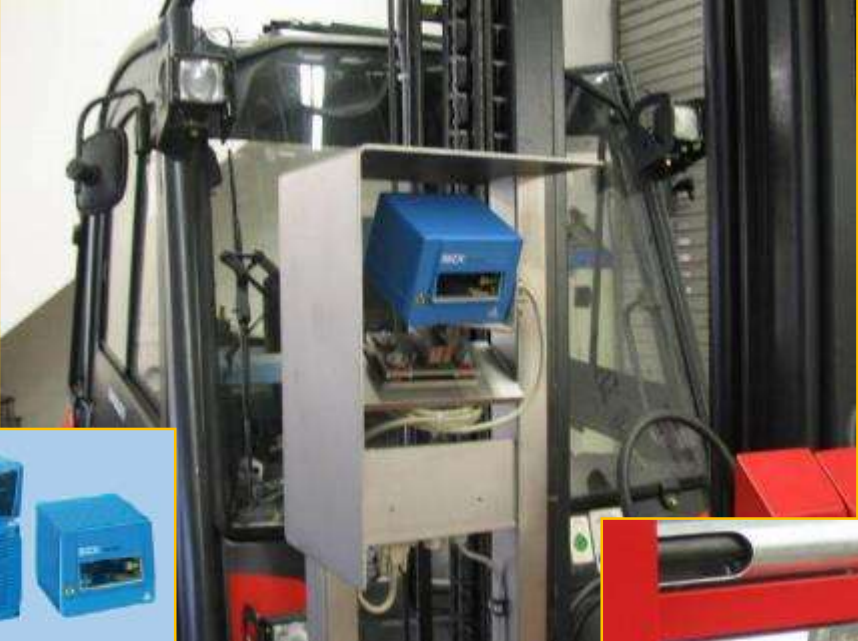
# Equipment for forklift trucks

Mobile barcode hand scanning devices for use in warehouse



# Equipment for forklift trucks

Mobil terminal PC with fix barcode laser scanner and approaching sensor as trigger




**CLV49x**  
Der Hochleistungs-Barcodescanner

Autofokus

≤ 60° / ≤ 50°

600 Hz ... 1.200 Hz

0.17 mm ... 1.2 mm

400 mm ... 2.200 mm

✓ , AUX (nur RS-232)



# Localization and navigation for forklift trucks

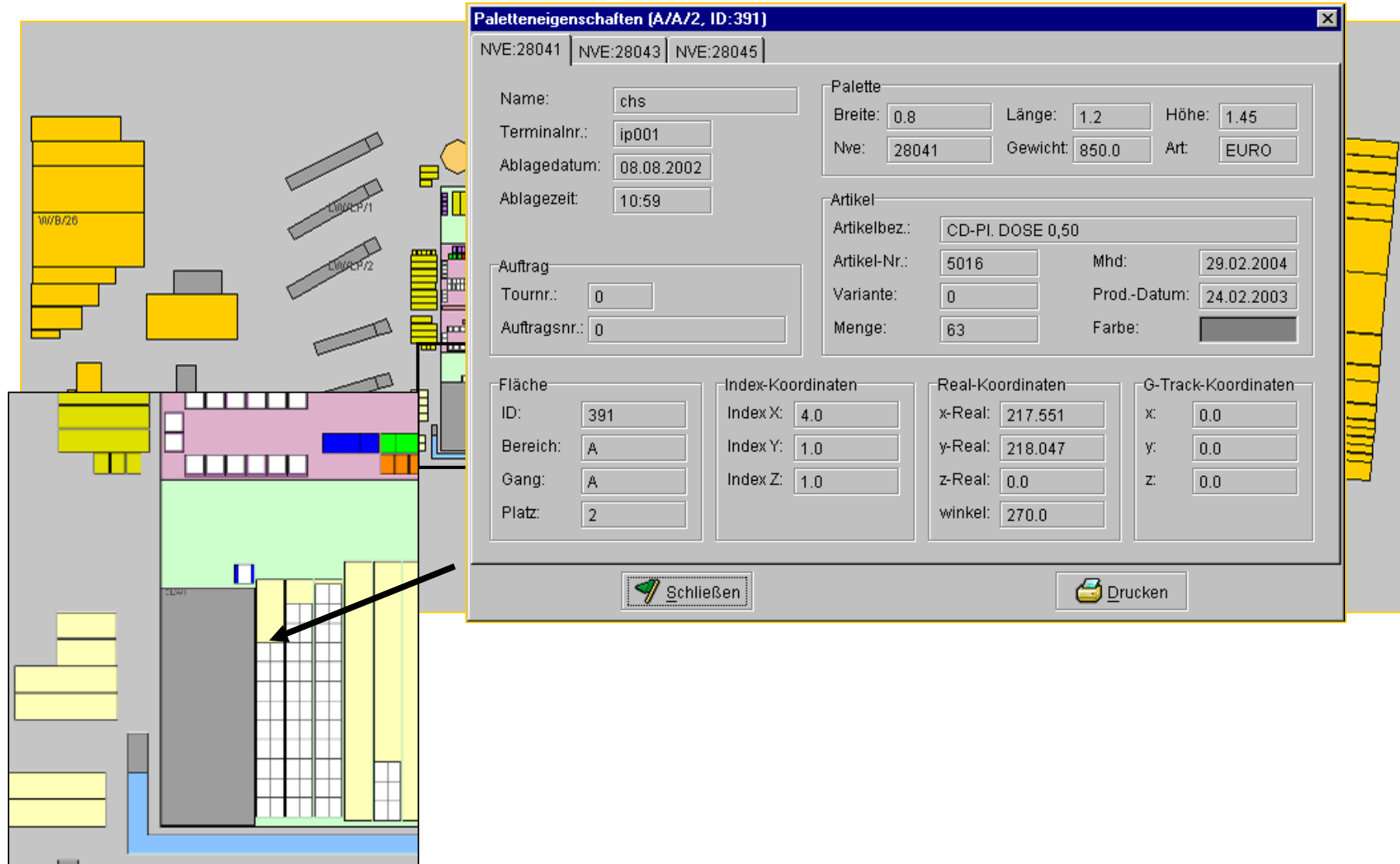
Main differences between the systems:

- + Locanis (Gyro sensors on forklift truck + reference stripes)
- + Indyon (RFID tags in ware house floor)
- + Zeno-Track (2 Cameras recognizing the environment)
- + LogTREK (2D-code on ceiling)





# Localization of unit loads in Warehouse



**Paletteneigenschaften [A/A/2, ID:391]**

NVE:28041 | NVE:28043 | NVE:28045

Name:  Palette

Terminalnr.:  Breite:  Länge:  Höhe:

Ablagedatum:  Nve:  Gewicht:  Art:

Ablagezeit:

Auftrag

Tournr.:  Artikel

Auftragsnr.:  Artikelbez.:

Artikel-Nr.:  Mhd:

Variante:  Prod.-Datum:

Menge:  Farbe:

Fläche

ID:  Index-Koordinaten

Bereich:  Index X:  Real-Koordinaten

Gang:  Index Y:  x-Real:  G-Track-Koordinaten

Platz:  Index Z:  y-Real:  x:

z-Real:  y:

winkel:  z:

# Automated Guides Vehicles (AGV)



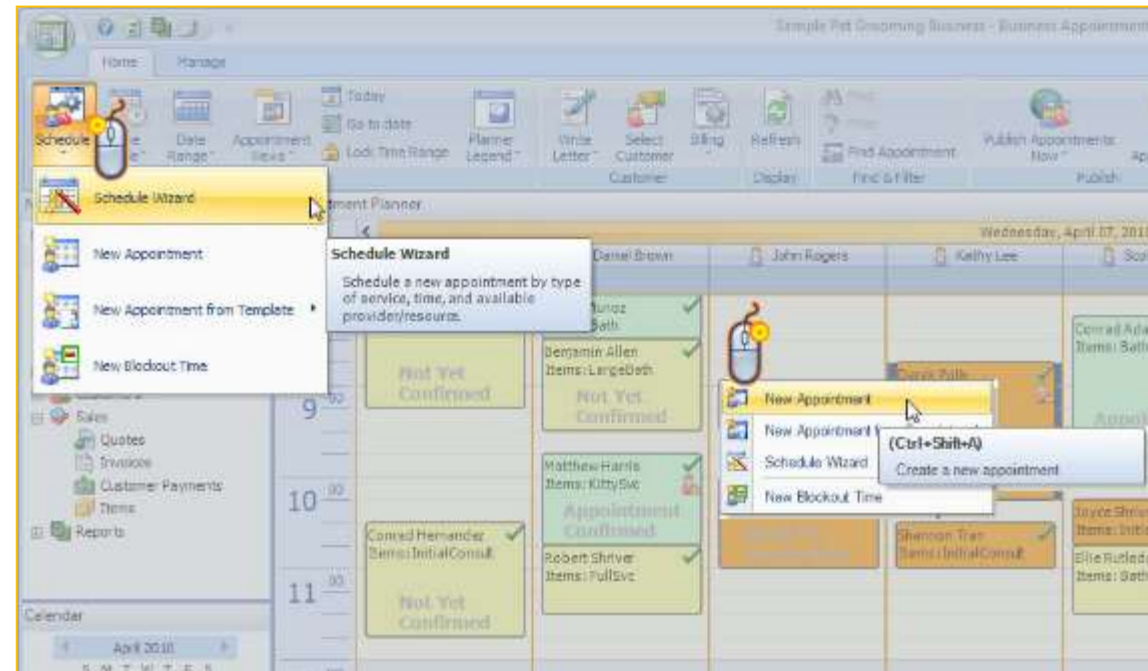
# Automated Guides Vehicles (AGV)



→ Maximum Load  
→ Minimum Transport

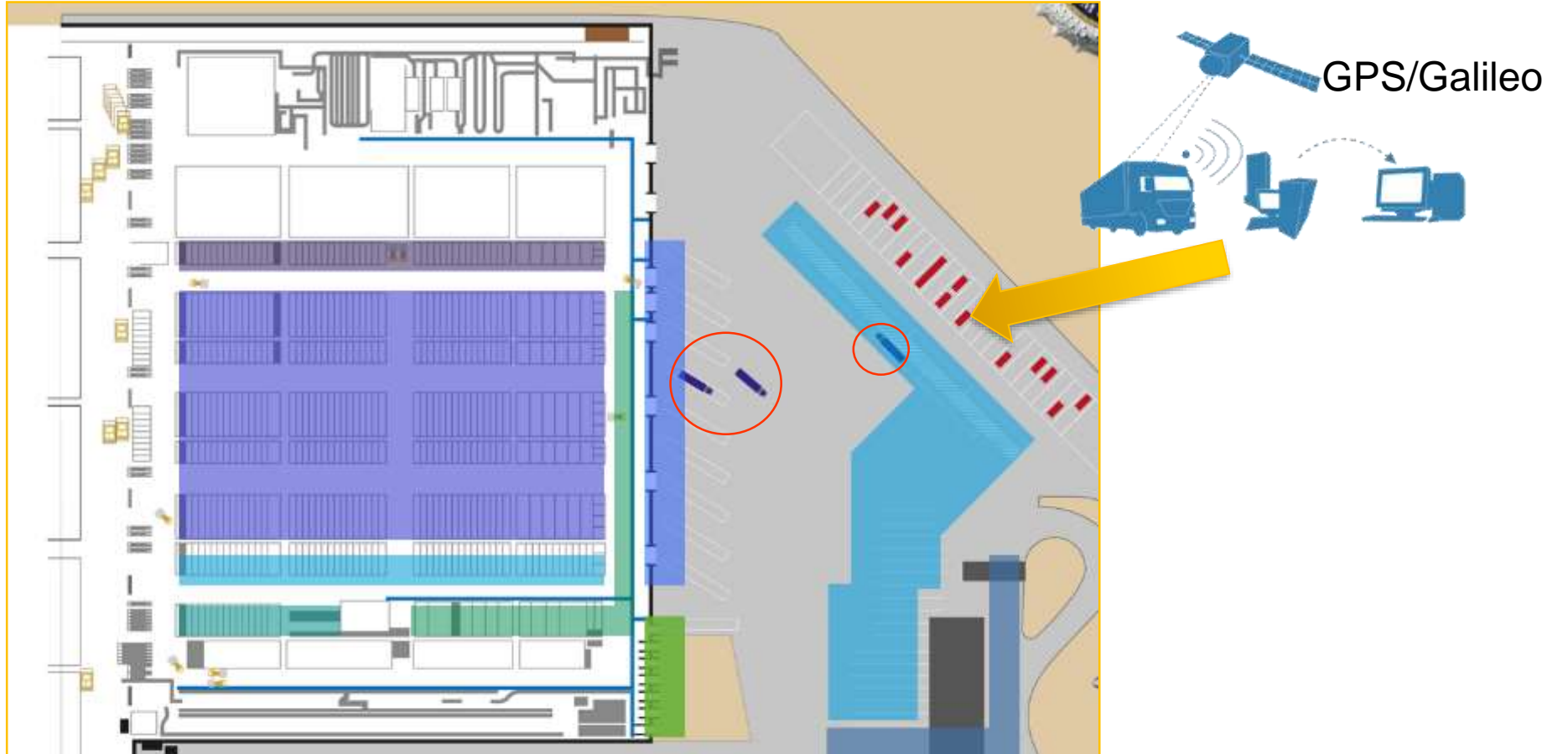


# Time slot management – Platform for steering of incoming trucks



# Yard management systems

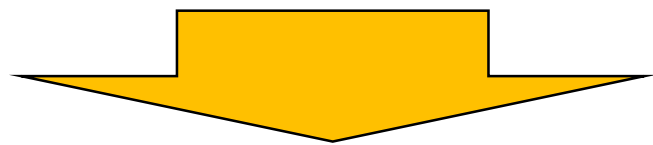
## Localization of trucks and objects in warehouse and on the yard



# Digitalization of the delivery process for beer



Mobil Devices  
(2014)



Mobile Base DS9

Samsung Galaxy  
XCover 3

Zebra ZQ510



Smart Devices  
(2019)



## Summary and outlook

# Digital Beer and Beverage Supply Chain (Pull)





# Summary and outlook 1

## Some core-statements from the work of the VLB technical committee and the working groups

- + Digitalization is not an end in itself, but information technology does not make anything better.
- + The digital transformation offers opportunities, in particular through more and better networking.
- + To get an orderly picture, all technologies should be sorted in a modular system.
- + However, the benefits and the potential decide in the use of the beverage SC processes.
- + A standardized process system is therefore important for market participants, individually and collectively.
- + The networking of players and their business systems in the market model shows the overall picture.
- + Based on the market model, 2 perspectives are formed:
  - The view of the supply chain - processes:
    - Where is there today transparency and efficiency losses?
    - Which problem drivers endanger the ability to deliver today?
    - Which requirements of cooperative information logistics exist today?
  - The view of digital technologies:
    - Which clusters and building blocks of Digitalization can be found and delineated?
    - How can the blocks be meaningfully assigned to the processes?
    - What potential can be found in the cooperative and collective view?

# Summary and outlook 2

## Internal Digitalization:

- + Existing manual warehouses can be equipped with information technology to achieve a digitalization of the material and product flow.
- + Digitalization raises transparency in a manual warehouse.
- + Automated identification of products guarantees a precise monitoring of the batches and an exact first in first out strategy.
- + Navigation systems for forklift truck can help to optimize the warehouse traffic.
- + Navigation systems helps new and inexperienced staff to find the best way to the right products.
- + RFID is an emerging technology that can be used for many sense full identification solutions.
- + Smart devices (S-phone, tablet, S-watch) are available for low prices.

# Summary and outlook 3

## External Digitalization:

- + The Digitalization of processes offers great potential.
- + Within the beverage supply chain, a cooperative approach is important.
- + Beverage manufacturers and beverage wholesalers are the mainstream and need to be closely linked through Digitalization in terms of information and process.
- + Standardization of information, processes and equipment is a prerequisite.
  
- + Within the framework of the VLB Logistics Expert Committee, relevant process models were described.
- + Pilot projects for testing and implementation can now be started.
- + For the optimization potentials, "Good Practice Solutions" should be developed and evaluated.

# Thank you for your attention!

**VLB Berlin e.V.**

**Dr. Josef Fontaine (GM and CEO)**

**For further questions please also contact:**

**VLB Berlin e.V. – Research institute for management & beverage logistics (FIM)**

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