

**A new generation of mobile logistics robots:
affordable, customizable, human-friendly and safe!**

www.kelo-robotics.com





Hospitals and hospital chains

2 million¹⁾ healthcare workers missing in EU

- Highly qualified care personnel is tasked with low-qualified activities such as transportation and lifting
- Most frequent illness: burn-out and back problems

¹⁾ <https://healthcare-in-europe.com/en/news/by-2020-europe-may-be-short-of-two-million-healthcare-workers.html>

²⁾ <https://telematics-magazine.com/fachkraeftemangel-in-der-logistik/>



Warehouses and distribution centers

50.000+²⁾ unfilled jobs for transportation workers in Germany

- Limits growth and competitiveness
- Increasing number of accidents and safety issues



Manufacturing

In the US 300.000³⁾ boomer turn 65 every month

- Industry is dramatically losing skilled workers
- Senior workers, if they stay in the job, cannot perform heavy work (lifting, transportation)

³⁾ <https://www.industryweek.com/talent/article/21127516/us-economy-will-be-in-trouble-if-boomers-dont-come-back-to-work>

Our solution: A platform concept for the rapid and cost-efficient design of mobile logistics robots

KELO Drive

A key component for future generations of mobile service robots

- Omnidirectional and inherently safe
- Highly modular and configurable

Patent pending!



KELO ROBILE

Construction kit for rapid prototyping of mobile service robots

- Modularized and standardized
- Design rapid hardware prototypes within hours

Patent pending!



KELO 500 DT

("dock & tow")

Autonomous towing of roll container



KELO 350 LC

("lift & carry")

Autonomous transportation of logistics pods



KELO 250 GT

Shopping guide in retail, guide and luggage transporter for large facilities



KELO AD

Autonomous disinfection of public environments with UVC light

Our competitors: AGVs and AMRs¹⁾ in intralogistics ...



Our unique sales proposition

	KELO robots	Comparable AMRs
Price	65-70%	100%
Payload-weight ratio	6:1	3:1
Max. velocity	5 m/s	1,5 m/s
Kinematics	omnidirectional	mostly differential
Maneuverability	very high	limited
Safety	inherently safe	no inherent safety
Modularity and Configurability	arbitrary configurations from 1 to n active drives	monolithic, no modularity
Customizability	fully customizable	limited
Robustness	several drives can fail while vehicle stays functional	all drives must work to keep vehicle functional
Handling of legacy	yes	limited

...and their deficits. They ...

are bulky and heavy,

do not scale and cannot be easily configured,

offer solutions, which may not fit the problem,

are rather expensive (even in China).

¹⁾ AGV: automatically guided vehicle; AMR: autonomous mobile robots (with free navigation capabilities)

Our team

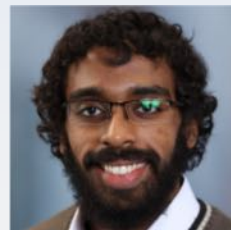
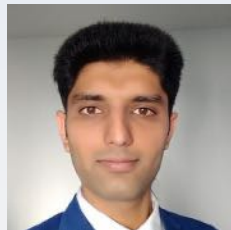
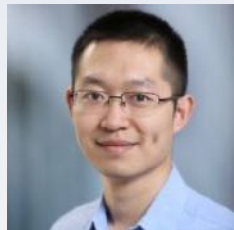
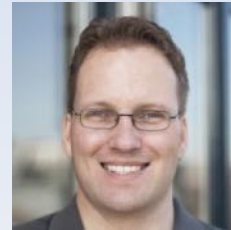
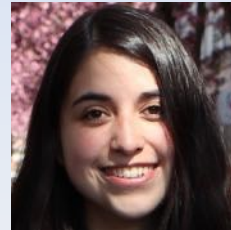
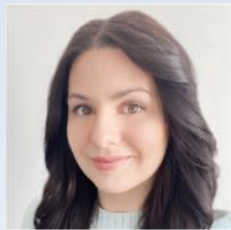
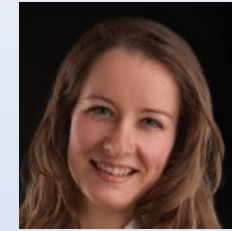
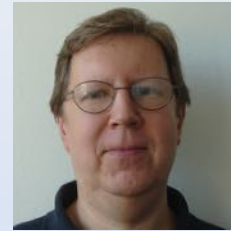
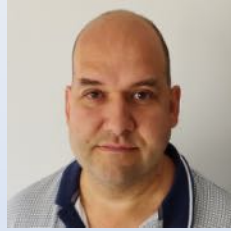
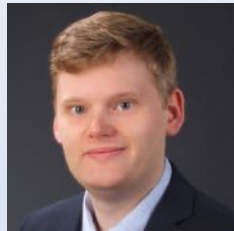
Arthur Ketels

Co-founder and CTO
Education in production
automation from Technische
Hogeschool Den Bosch.
Developed numerous
mechatronics systems for a
range of applications for
customers worldwide.



Dr. Erwin Prassler

Co-founder CEO
Co-founder of several
service robotics startups
(all but one still in business)
Prof. for AI and Robotics
10+ years experience as CEO
25+ years experience in
managing large projects



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We are a fast-growing team of robotic engineers with a background in control theory, mechanical, electronic, mechatronic, and software engineering. Our engineers are supported by a very agile team assistant who is an allrounder and takes care of virtually everything, which is not related to product development and engineering. All our graphics and visual design work is created by a very talented graphic designer. Last but not least we have recently recruited a sales person as the core of a sales team, that we want to built up as fast as possible.

Our traction



2018 / 2019

(before incorporation)

- Finalist in Fasttrack Startup Contest in 2018
- First industrial pilots with two German automotive suppliers (KELO not incorporated yet)
- Readiness of technology: TRL 5 - 6

2021

- In January 2021, spin-off product “KELO ROBILE - a construction kit for mobile service robots” launched
- In April 2021, finalist in two pitch contests ScaleUp4Europe and VENTURE.log
- Pilot with potential distributor Wanzl (DHL)
- Invited to 2021 Annual Congress European Business Angel Network
- Readiness of technology (so far): TRL 7

2020

- **Founded in March 2020** as joint venture to exploit results of EU funded project ROPOD (grant no. 731848)
- First “Lot size 1” joint development with a contract volume of 800.000 EUR
- In June 2020, 100.000 EUR cascaded funding from DIH-HERO for development of UVC disinfection robot
- In August 2020, prototype of UVC robot deployed to hospital Bad Kreuznach
- Readiness of technology: TRL 6

KELO
Robotics



Global market for logistics robots in 2027

Segmentation:

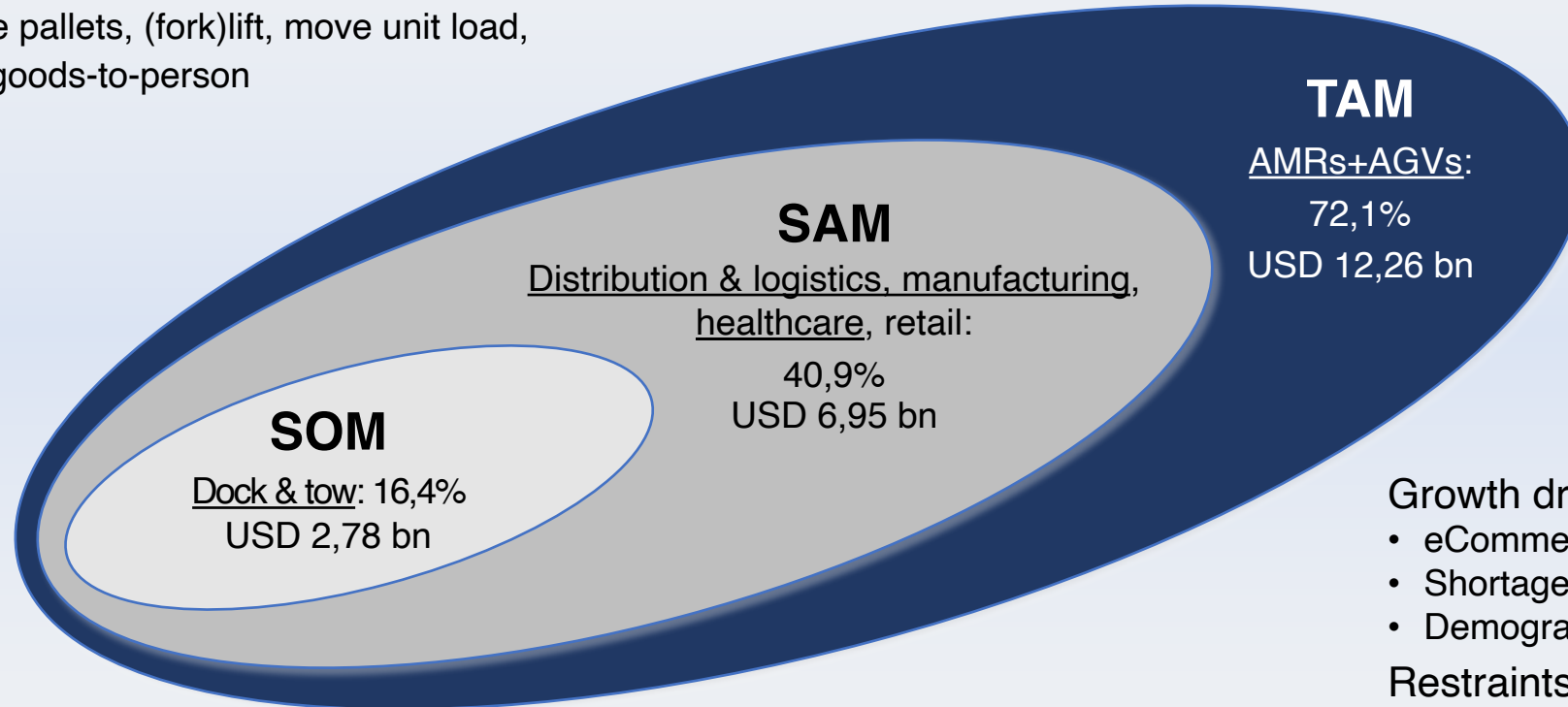
Type: AGVs, AMRs, robot arms, other (UAV)

Industries (vertical): Distribution & logistics, automotive, manufacturing, healthcare, retail, hospitality, other

Functions: Tow, move pallets, (fork)lift, move unit load, pick & place, goods-to-person

USD 17 billion

Average over several market studies on logistics robots



Growth drivers:

- eCommerce
- Shortage of personnel
- Demographic change

Restrains:

- Cost
- Incompatibility with legacy

TAM: Global market for AGVs and AMRs make 72,1% of logistics robots worldwide

SAM: AGV and AMR in distribution & logistics, manufacturing, healthcare, and retail make 40,9%

SOM: Dock & tow robots in distribution & logistics and manufacturing in Europe make 16,4% of global logistics robots worldwide

Generation of revenue and “goto market” strategy

Sales (direct and via distributors) 85%

- Direct distribution of robot components (drives, sensors, KELO ROBILE via online shop)
- Sales of off-the-shelf robots via own sales network and via distributors (e.g. Wanzl)

Robots as a Service 13%

- Renting robots
- Applies only to available KELO robots, no customization
- Contract with 3 years minimum run time



We have a customer base of 1.300 potential customers and a mailing list with 9.000 entries from earlier business

“Lot size 1” *) 1%

- Shared cost – shared ownership
- Customer receives all documents necessary to manufacture and commercialize robot
- KELO retains the right to independently commercialize results

Market launch for logistics robots: LogiMAT 2022 in Stuttgart in March 2022

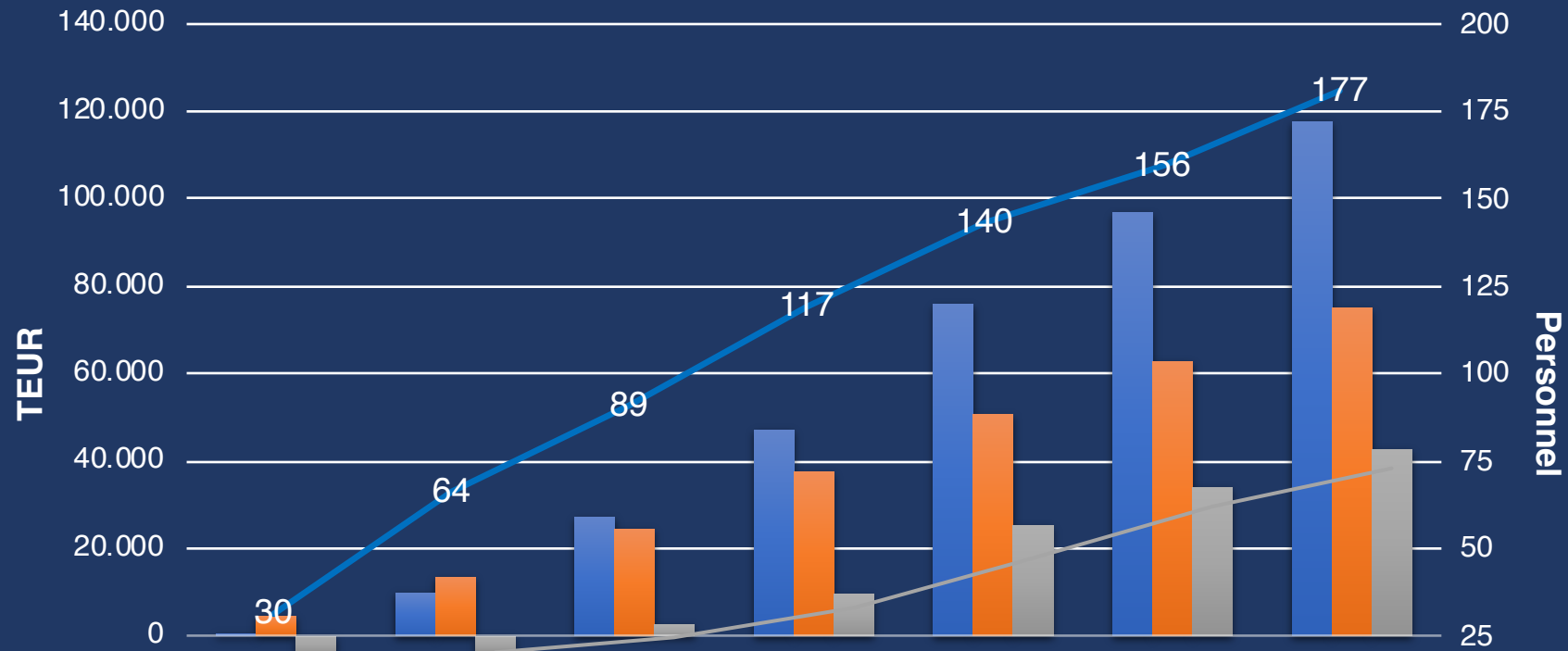
Markets and Markets (July 2020): *“Tow vehicles to hold the largest share of the AGV Market in 2020.”*

“Lot size 100” *) 1%

- Customers guarantees order of 100 devices
- KELO covers complete R&D cost
- KELO remains owner of R&D results, no transfer of IPR to customer

*) At a first glance these business models do not seem to be a valid source of revenue. **They serve in the first place as vehicles for customer acquisition, however.** Revenues listed here are only development cost and not sales and long term customer relationships resulting from these joint developments later.

Forecast First 7 years



Growth:

EBT: from -3,94 to 42,63 MEUR

Team size: from 30 to 177

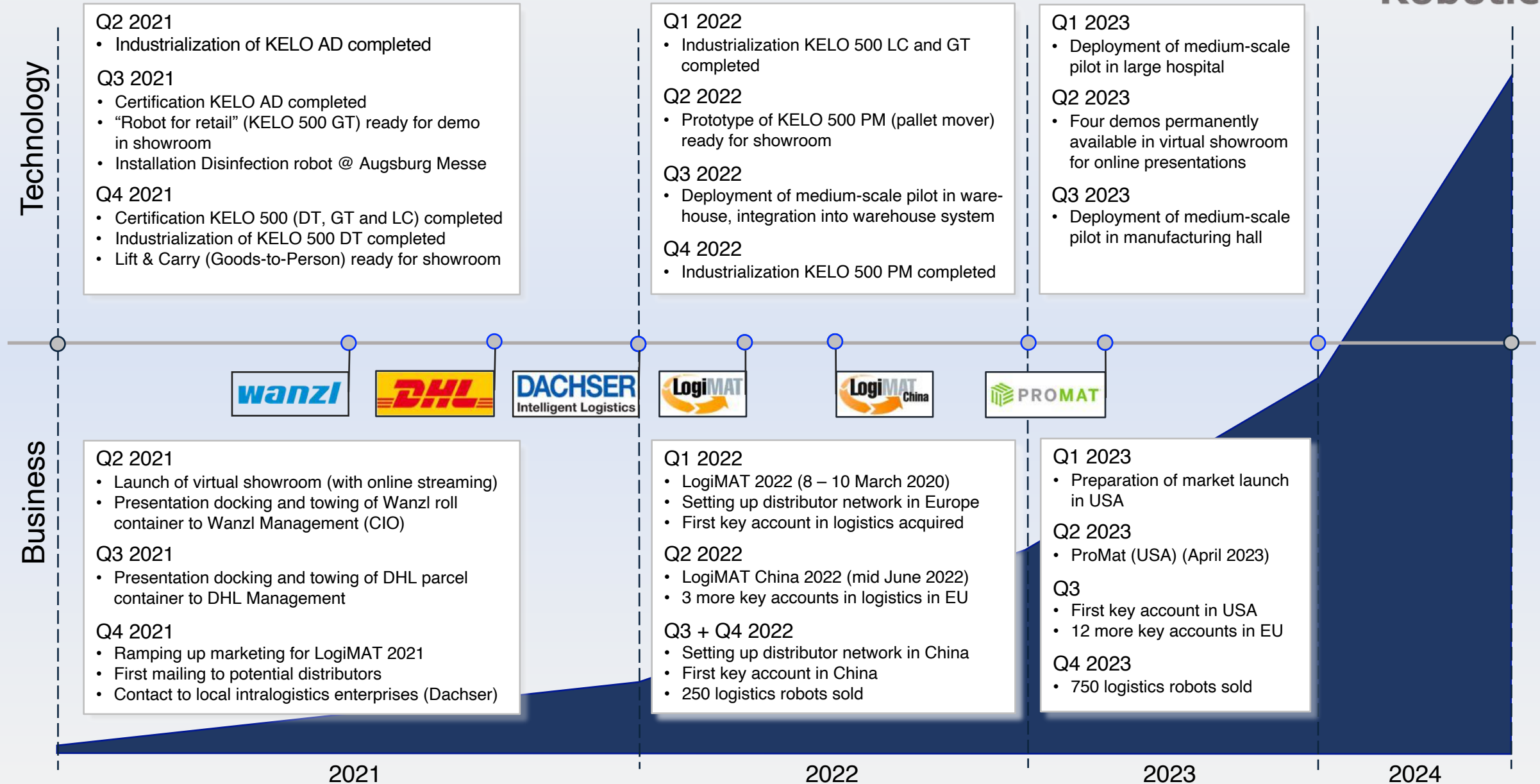
Robots (units)

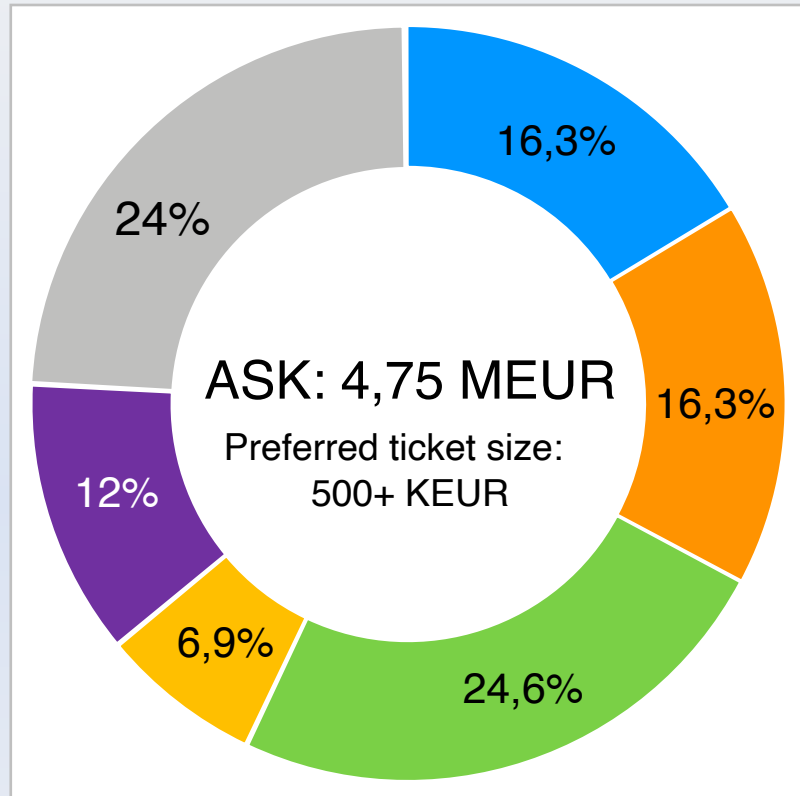
- Logistics: from 6 to 3.500
- Disinfection: from 6 to 375
- RAAS: from 10 to 675

Break even: Q2 Year 3

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Earnings	669	9.827	27.129	47.097	75.936	96.786	117.634
Expenses	4.608	13.506	24.466	37.504	50.716	62.824	75.000
EBT	-3.939	-3.679	2.664	9.594	25.220	33.962	42.635

Implementation roadmap and milestones





Why invest in us now?

- Key technology for future generations of mobile service robots patented
- Critical technology reached TRL7
- Industrialization on its way
- First robots sold (as prototypes)
- Spin-off product already launched
- First pilots with potential customers on the way
- **Global market growing rapidly!!!**

Preparation of roll-out

- Industrialization
- Pilot projects with customers
- Certification
- Setting up supply chain and manufacturing

Management

Research and Development

- Development of new key technology
- Extending product portfolio
- Lot size 1
- Lot size 100

Operation

Marketing and sales

- Marketing for roll out (prepare exhibits, create visibility)
- Preparation of internationalization
- Setting up distributor network
- Acquiring key accounts

Material & manufacturing

You name it, we move it!