

CASE STUDY

BRØDRENE DAHL



Sustainability and business development through warehouse automation



Making the world a better home

Making the world a better home – this is the motto of Brødrene Dahl, Denmark's largest wholesale supplier of heating, plumbing and sanitary ware products as well as the international group Saint Gobain of which the company is a member. Brødrene Dahl turns that motto into reality through efficient deliveries to customers all over Denmark, but that's not all: The company is on a mission to develop sustainable logistics and reduce CO₂ emissions. The automation of the central warehouse in Randers makes both goals possible. It is a solution where reusable blue plastic containers

and a long-term, close relationship with automation expert KNAPP have been key to sustainable success. The 110 meters long and 20 meters tall warehouse building has a ground floor the size of a football pitch. At the heart of the solution is an Evo Shuttle system that is run with 136 shuttles, providing 100,000 cubic meters of storage space. A total of 1,700 deliveries are made daily to Brødrene Dahl's own stores and to installers throughout Denmark.

The goal of the solution from KNAPP was to save costs, increase productivity and

strengthen quality all the way from goods reception to palletizing. Not only that, but the solution has also increased safety for employees as heavy lifting was reduced. In addition, the automation has been strategically important for Brødrene Dahl's business development. To meet customer demand, new product segments have been added and the total range has increased by over 10,000 products over the last 10 years. This, of course, has also made warehousing more complex.



Sector: Wholesale

Location: Randers, Denmark

Employees: 1,000 (200 in Denmark)

Revenue: 600 Mio EUR

Business areas: Wholesale supplier of heating, plumbing and sanitary ware products

Go live: 2023 (extension)

Warehousing space: 100,000 m³ | 8,500 m²

Storage locations: 99,600

SKUs: 28,000

Containers: 85,500

Delivery area: Denmark

Deliveries / day: 1,700

Lines / day: 11,000

Items / day: 12–24,000

Delivery window: 12 hours

Techn. solution: Evo Shuttle, 5 Pick-it-Easy picking stations, 1 Pick-it-Easy picking robot, 1 palletizing robot, box raiser and box sealer, pallet wrapping machine



From manual labour to efficient automation

01

Sustainability

Brødrene Dahl has a long-term ambition of becoming climate-neutral by 2050. The KNAPP solution delivers shuttles that consume only 10 % of electricity compared to traditional small parts warehouse solutions.

02

Maximizing efficiency

The automation solution has increased the warehouse capacity by 50 % and has improved even more since its first implementation.

03

Improving capacity

New product segments have been added and the total range has increased by over 10,000 products. Now, it is possible to stock many more items.

04

Lower error rates

While the warehouse capacity has increased, errors have decreased from 2.5 per thousand to 1.0 per thousand items.

05

Project "Blue Container"

The automation solution was developed and adapted to also handle the new packaging solution. Instead of regular cardboard totes, that are just thrown away, blue totes can be reused more than a hundred times.

06

Improved working conditions

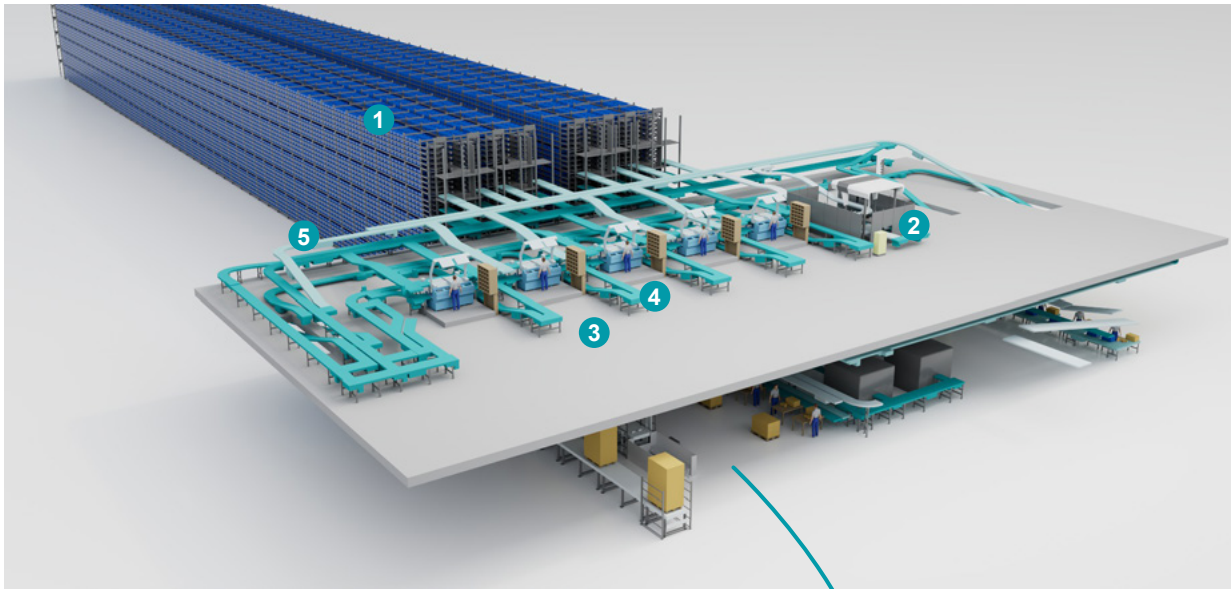
The manual Pick-it-Easy work stations create better ergonomics and the Pick-it-Easy Robot does the heavy lifting, taking the strain off employees.



“It is fair to say that the LOGSTAR project has enabled the expansion of our product range and thus improved the offer to our customers.”

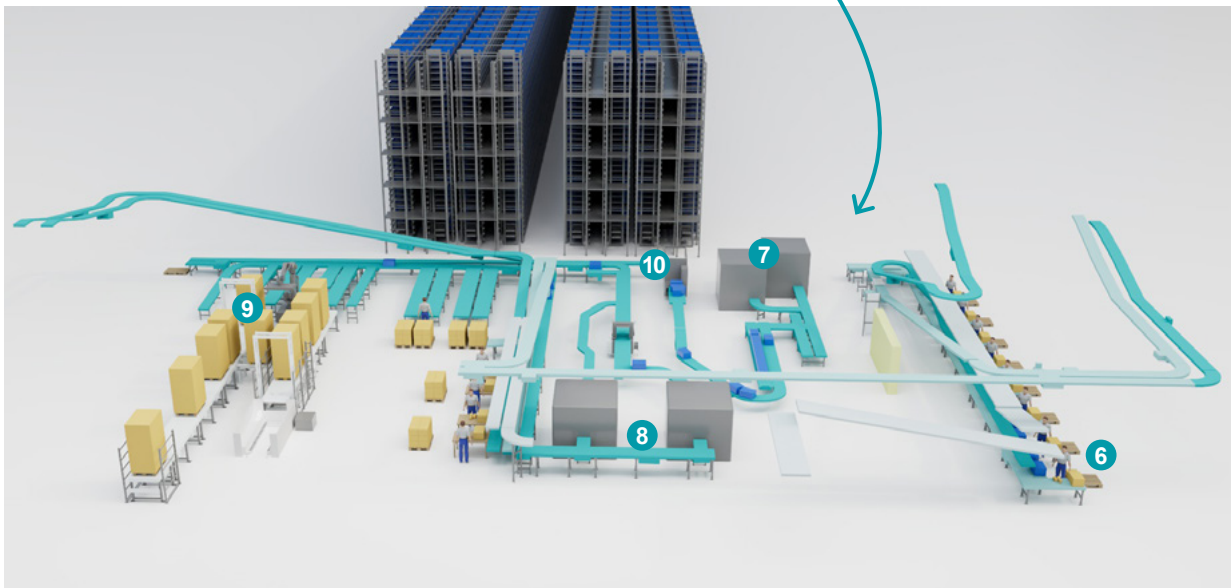
Lasse Halliday
Logistics Director
Brødrene Dahl

The warehouse at a glance



MEZZANINE

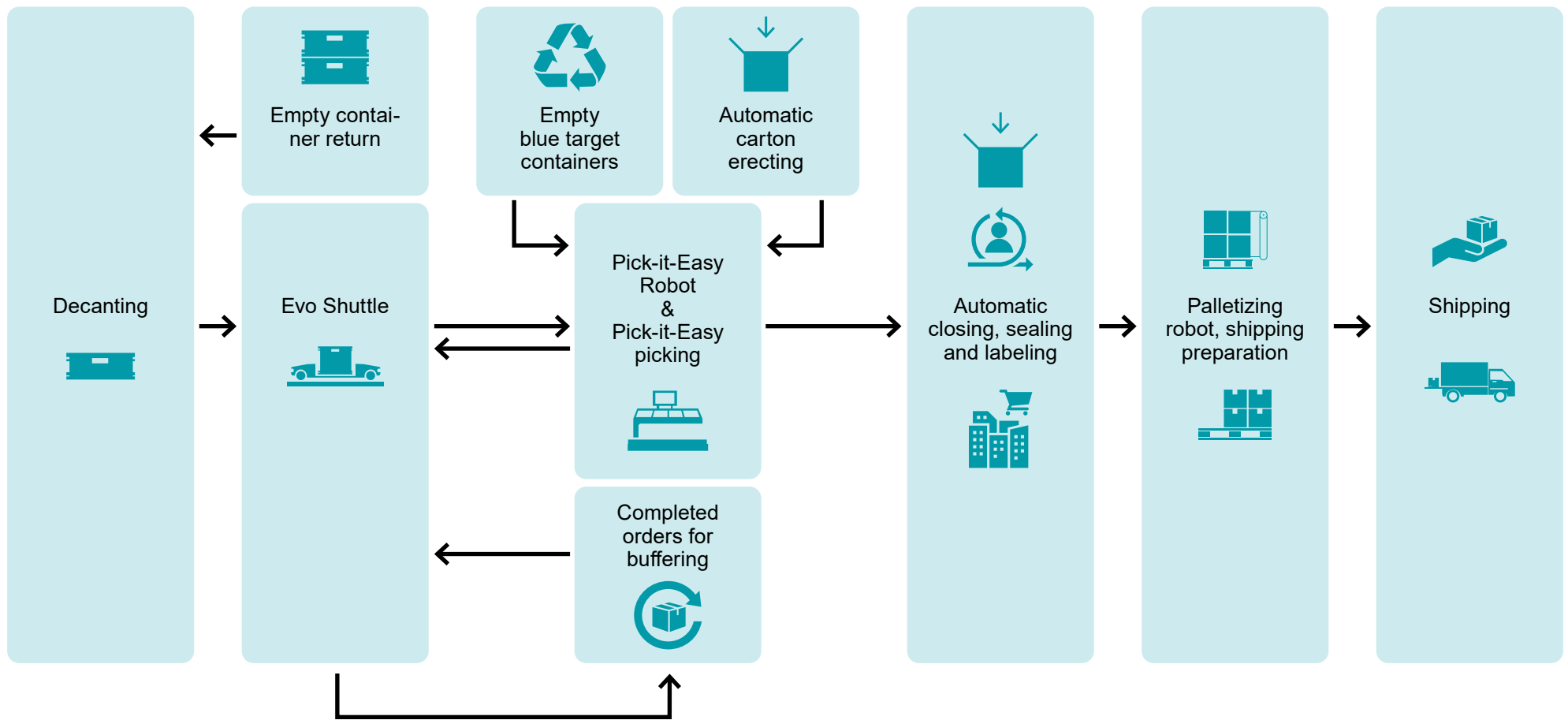
- 1 Evo Shuttle**
4 aisles, 34 levels, 136 shuttles,
99,600 storage locations
- 2 Pick-it-Easy Robot**
- 3 Pick-it-Easy Shop** – modified for blue
totes in 2022
- 4 Target conveyor feeding Pick-it-Easy
stations**
- 5 Conveyor for finished orders for
buffering in Evo Shuttle**



GROUND FLOOR

- 6 Decanting**
- 7 Carton erector machines**
- 8 Carton closing machines**
- 9 Palletizing Robot**
- 10 Buffer for blue totes**

Material flow



Central warehouse processes

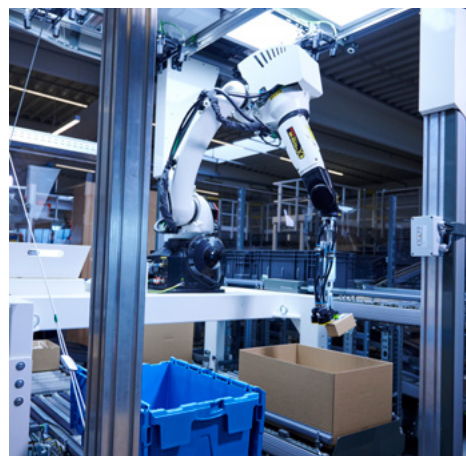
1| Goods reception

The goods arrive at 8 goods-receiving stations on the first floor and are decanted into storage containers. The containers are then sent to the OSR Shuttle Evo and stored until an order for the respective item is received. Depending on the order, a load unit is prepared in the form of a large or small carton, or a blue plastic container. The load units are then labeled and ready for picking.



2| Picking

The cartons and containers are transported to the upper level for picking in one of the 5 manual stations or by the Pick-it-Easy Robot. The orders can also be pre-picked by the robot and then completed manually. Manual picking is carried out using Pick-to-Light technology. After picking is completed, the load units are sent back to the Evo Shuttle for intermediate storage before delivery.



3| Closing and palletizing

The pre-packaged cartons and blue plastic containers are transported to the first floor where the cartons are sealed and receive lids. The blue containers are sealed with a band. The load units are marked for delivery and moved to the palletizing robot, which has six conveyor belts for the different load unit types. The robot places the blue plastic containers on the pallet first for stability, followed by the cartons on top. Similarly, replenishment orders for stores are placed on the bottom, while orders to customers are placed on top.



4| Delivery

When a pallet is completed, it moves on to the automatic pallet wrapping machine. The pallet is then picked up by an AGV and transported to the correct terminal for delivery.



Pick-it-Easy Robot makes more picks possible

When orders arrive at the LOGSTAR warehouse, the items are retrieved from the Evo Shuttle and transported to the top floor. There, 5 manual Pick-it-Easy work stations are ready for further processing, and since May 2023, also the Pick-it-Easy Robot. Over the last 10 years, Brødrene Dahl's product range has increased by 40 %, resulting in many more picks in the warehouse. To meet this challenge, the company turned to robotization. The new robot enables picking 24 hours a day and increases capacity in the warehouse, without the need of more personnel.

Each order to be picked is assigned to either a manual Pick-it-Easy work station or the picking robot, or a combination of both. The manual stations provide space for 5 order containers and 2 storage containers, with picking being carried out using Pick-to-Light technology. The Pick-it-Easy Robot has space for order containers, however, contrary to the manual stations, it picks from only one storage container at a time.

The robot picks into cartons as well as into the reusable plastic containers. It can also be used for pre-picking. Often, an order is pre-picked by the picking robot and then completed at one of the manual stations.

Today, the robot processes around 7,000 items and up to 1,100 order lines per day. The solution is continuously being further developed in close collaboration with KNAPP to further increase the picking robot's capacity.



Blue containers make for green success

Brødrene Dahl has a long-term ambition of becoming climate-neutral by 2050. Many measures have already been taken to reduce CO₂ emissions throughout the business. The transition to fossil-free transport is, of course, an important focus area, but even within warehouse management much can be done to reduce emissions. Motion-controlled LED lighting and 2,300 square meters of solar panels on the roof are just a few examples. Sustainability has also been considered in the automation solution itself. The shuttles in the Evo Shuttle system consume only 10 % of electricity compared to a traditional small parts warehouse solution.

In 2022, another sustainability project was launched, “the Blue Tote Project”. As an alternative to regular cardboard boxes, a delivery option involving blue plastic containers was introduced to be sent out from the warehouse and sent back for reuse. This means reduced packaging costs for Brødrene Dahl, less handling of empty cartons for customers and reduced CO₂ emissions to the environment – in other words, a win-win-win situation.

Together with KNAPP, the automation solution was developed and adapted to also handle the new load unit solution. Today, the blue plastic containers work well together with the Pick-it-Easy Robot and, after some adjustments and adding some conveyor belts, also with the palletizing robot.

Since October 2022, all replenishment orders for the stores are sent out in blue plastic containers instead of cartons, and for direct deliveries, customers are offered to choose the reusable solution. So far, deliveries have been made to the customers’ business address, but the plan is to offer this delivery concept also to larger on-site projects, where a return flow for containers can be created. Since the start of the project, 250,000 blue containers have left the LOGSTAR warehouse, the use of cardboard packaging has decreased by 40 % with the new system having resulted in a reduction of 225 tons in CO₂ emissions.



Together we can do so much

The collaboration between Brødrene Dahl and KNAPP began in 2013 when LOGSTAR, a new building with an automated small parts warehouse was built as an extension of the company's main warehouse facility in Randers, Denmark.

Lasse Halliday, Logistics Director, remembers the beginnings of the partnership well. KNAPP offered them a solution for several parts of the material flow using one and the same technology. This was a decisive factor when choosing KNAPP as supplier. The company also appreciated KNAPP's experience: KNAPP is a partner who knows what they are talking about. In the future, they will continue to further develop the solution and increase

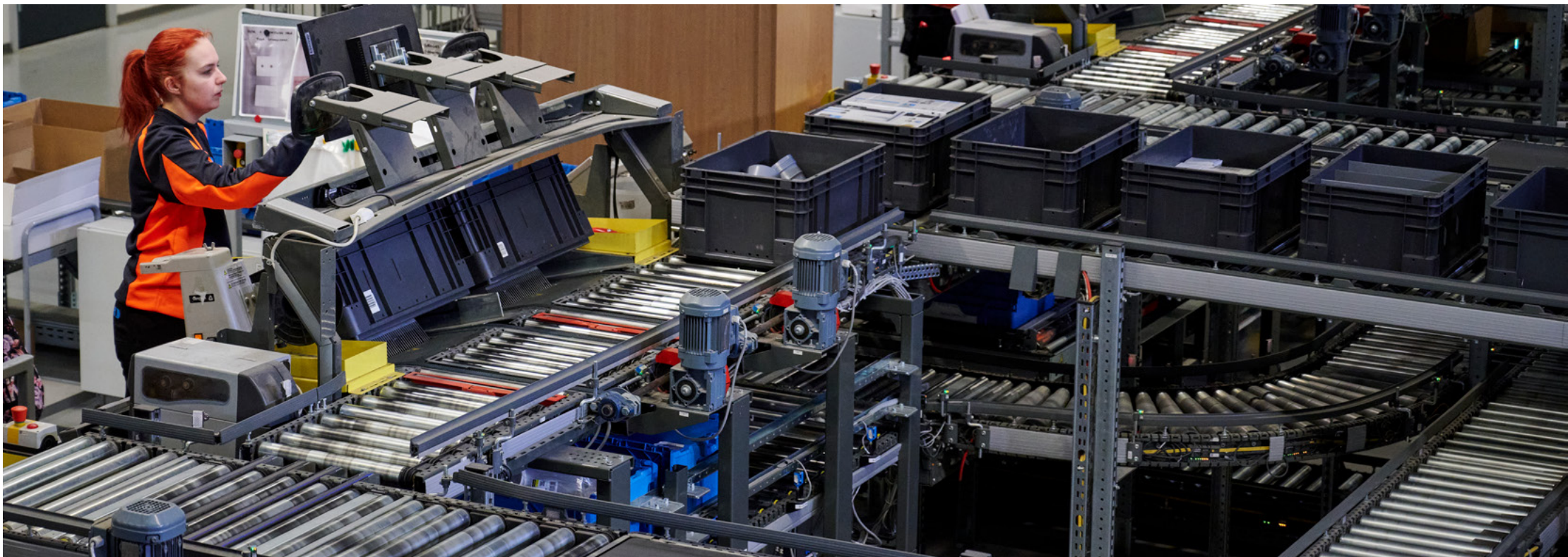
robotization, for example, in the goods-in area at the LOGSTAR warehouse. If needed, the existing Evo Shuttle system can be also expanded to create even more storage capacity. Another area of development is automating other parts of the warehouse facility here in Randers.

"KNAPP is a supplier of top-quality products. Their hardware is some of the best we've seen. What's more, when we approach them with challenges or potential problems, or we simply need help, they always come up with a solution, if not several", says Mathias Elkjær Nielsen, Project Manager, Brødrene Dahl.



"Logistics is the backbone of our entire business and the most important part of our customer offer."

Lasse Halliday
Logistics Director
Brødrene Dahl







Fashion



Food Retail



Healthcare



Industry



Retail

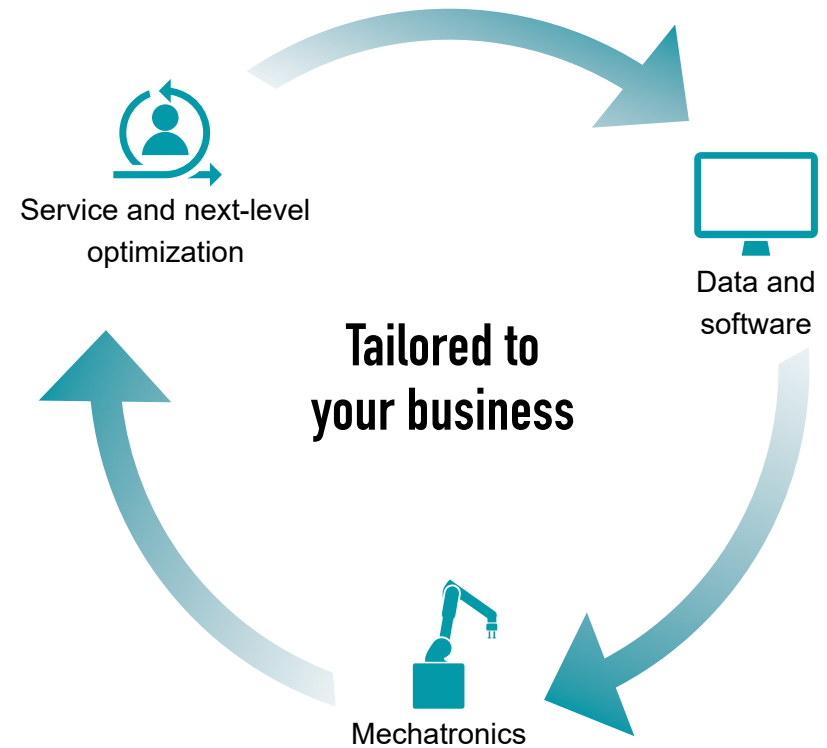


Wholesale

Expand your competitive advantages

We work together with you to design and build a system tailored to suit your logistics requirements, growth targets and investment strategy.

At KNAPP, our systems are not just off the rack. Instead, we take the time needed to learn about your needs, business model and challenges. Whether you want micro or macro, a semi-automatic system to help you get started or a fully automatic distribution center for top performance – we have just the right all-in-one solution for you.



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