

Digital Factory Acceleration

CASE ARTICLE



Baden-Jensen A/S

Towards a digital future through paperless production

August 2024

INDUSTRIENS FOND



Preface

In the past few years, Danish manufacturers have shown a significant interest in the Industry 4.0 agenda – now part of every innovation strategy - with the ambition of building a competitive advantage by capitalizing on them.

Nevertheless, it is clear how small- and medium-sized production companies (SMEs) often need practical support when it comes to identifying digital innovation opportunities and translating them into actual production performance improvement.

The Digital Factory Acceleration (DFA) program – a three-year program designed and executed by FORCE Technology and Aalborg University and co-financed by Industriens Fond – aims at providing this support. To extend its reach beyond the 21 companies that have the chance to directly join its projects, the Digital Factory Acceleration programme includes a number of articles where we present the key learnings emerged through the program.

This article presents an actual case from the program.

Introduction to the case company

Baden-Jensen

Baden-Jensen is a leading distributor of car and industrial paints in the Danish market.

The company is a third-generation family-owned business operating from three locations: the headquarters, warehouse and mixing facility in Ballerup, the warehouse and mixing facility in Kolding, and a training center in Middelfart.

For the past 80 years, one of the key competitive advantages for Baden-Jensen has been the high service level: a mix of fast response/low delivery times and high-quality technical consultancy.

To keep being competitive and further increase its service level, the company is looking at what new digital solutions can offer for streamlining warehousing and mixing operations, improving their efficiency and increasing the level of transparency across the company.

This was the reason for joining the Digital Factory Acceleration program in 2023.



Efficiency improvement opportunities

Phase 1: Digital Factory Mapping

The first phase of the program – the Digital Factory Mapping – has helped identify efficiency improvement opportunities and quantify the related impact on production efficiency. In fact, the systematic mapping and analysis of the material and information flows across planning, production and warehouse departments has highlighted three main issues – and quantified the related impact on production efficiency – leading to the proposal of three solutions.

Problem 1. Paper-based tracking of the order

Today all the activities performed to process an order are supported by paper (items to be picked, recipe for mixing paint, shipping information, list of returned goods). This entails a significant amount of time spent on printing/transporting/noting (up to 7% of the available capacity), unnecessary waste and, sometimes, errors.

Proposed solution: Paperless production consisting of tablets to show needed information to the operators, e.g. the picking list, the product location, and inventory status, and of scanners (QR/barcode) to automate the registration of performed activities (e.g. products picked from the inventory, delivery of orders, the opening of paint cans, etc.). This would improve efficiency, increase the service level and enhance traceability, cutting unnecessary waste.

Problem 2. Un-optimized picking routes

Today the route for picking the items ordered by a customer is decided on the spot by the warehouse operators, and the efficiency of the process is strongly dependent on the experience of the operator.

Proposed solution: Software-based routing to optimise the picking route based on set parameters such as weight, size and fragility, reducing the dependency on personal experience when picking items from the warehouse. This would decouple efficiency from experience.

Problem 3. Manual handling of mixing information

Today the mixing operator is manually retrieving order information from the ERP system and copy-pasting them into the mixing software, which identifies the right paints and their ratio for the mix. This is printed on paper and moved to the scale where the mixing is performed. In case of a mixing error, the mixing operator needs to go back to the computer, introduce the current mix ratio, re-calculate the ratio to obtain, print it and go back to the scale to adjust the mix. This generates significant time losses and, occasionally, waste.

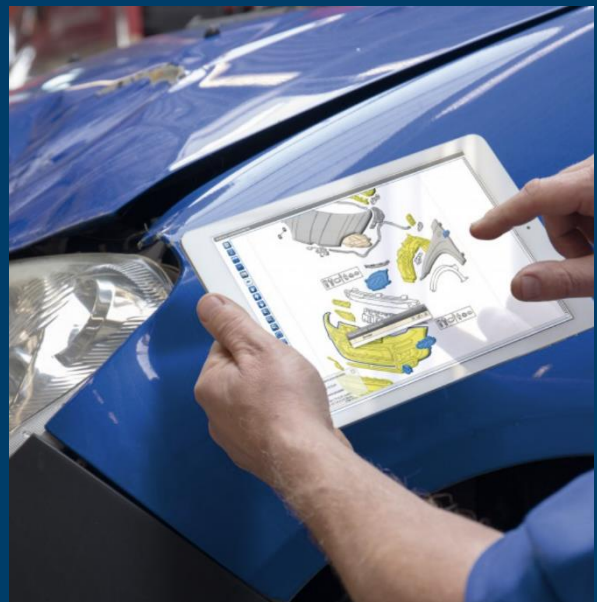
Proposed solution: Integration between the ERP, the mixing software and the scale used for the mixing operations to reduce the time required to set up the mixing process and, in case of error, to re-calculate the mixing ratio to obtain and re-start the mixing process.

The next step

Based on these findings and on the related impact, Baden-Jensen and FORCE Technology drafted a roadmap. According to that, the collaboration proceeded to address problem 1 (paper-based tracking of the order) by looking into the design of a paperless production solution, while Baden-Jensen immediately started addressing problem 3 (manual handling of mixing information) involving its software suppliers in order to build the necessary software integrations in the mixing room.

“It has been a great project, where we experienced an in-depth action and analysis leading to something tangible: we can see some well-documented benefits for all the solution proposals proposed by FORCE Technology”.

Martin Baden-Jensen, CEO, Baden-Jensen



Paperless production and software integrations

Phase 2: Digital Factory Realization

Based on the findings obtained through the Digital Factory Mapping, Baden-Jensen has started two of the identified activities.

The first activity has been performed internally and has been focused on addressing problem 3: the current manual handling of mixing information. The improvement project consisted in building the necessary integrations between the ERP, the mixing software and the scales used in the mixing room, leading to a fully digitalized flow enhancing the efficiency and quality of the mixing activities.

The second activity has been performed as a collaboration project between Baden-Jensen, its technology integrator JDM (now part of itm8), and FORCE Technology, and has been focused on addressing problem 1: the paper-based tracking of the production orders causing an up-to 7% potential capacity loss, unnecessary waste and occasional errors.

The aim of the activity was to identify, design, build, and test a paperless production solution to digitalize the entire information flow across the shop floor – whether related to the collection of order information, the update of stock levels, or the tracking of paint opening dates.

The activity has been performed through the following four steps.

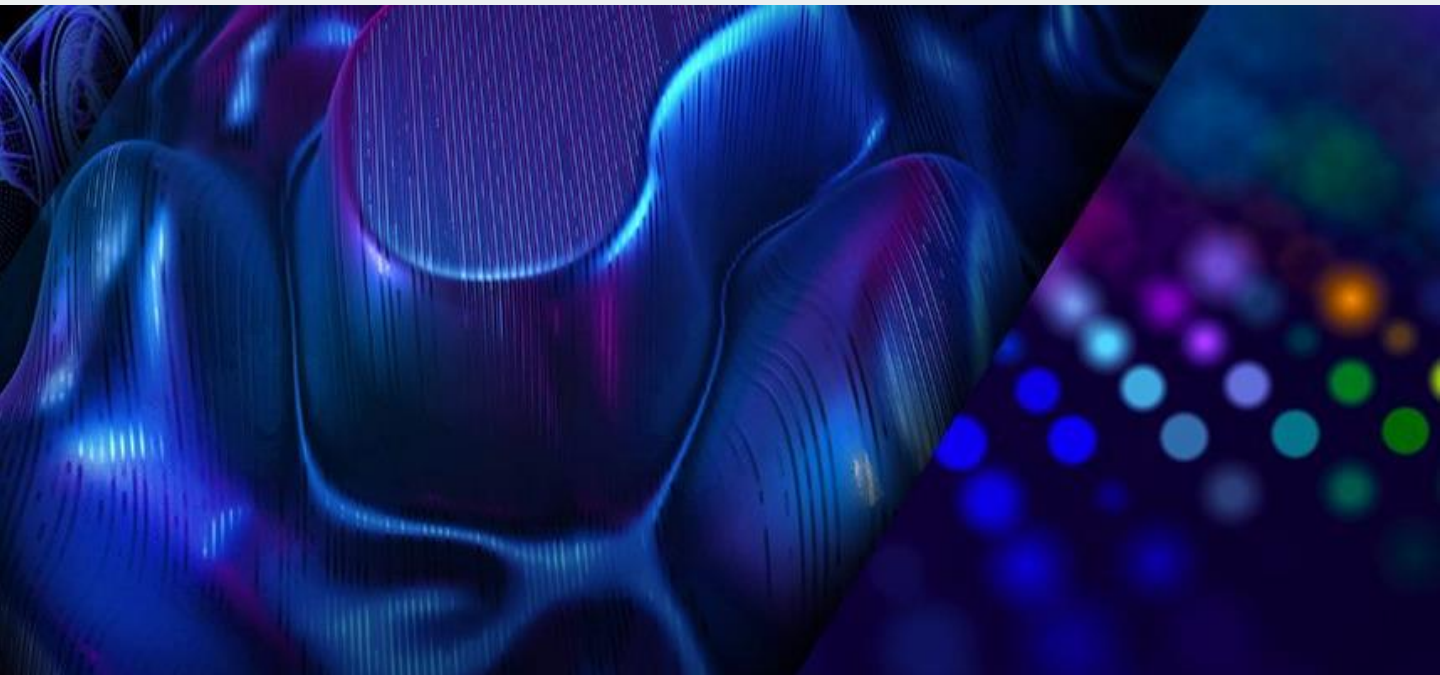
Step 1 – In-depth analysis of all the tasks to be supported by the paperless production solution.

Step 2 – Identification of possible paperless production setups (hardware, software, integrations, and functionalities) capable to support all the defined tasks, and provision of three potential offers.

Step 3 – Business case calculation and identification of the most viable offer.

Step 4 – Paperless production solution testing.

The project has provided Baden-Jensen with a functioning paperless production solution to digitalize the entire information flow on the shop floor, enhancing efficiency, improving quality performance and reducing waste – all to the benefit of an increased service level.



About the program

The Digital Factory Acceleration (DFA) is a three-year program, aiming at supporting Danish small- and medium-sized production companies (SMEs) improving their production performance through digital innovation.

The program consists of two phases: the Digital Factory Mapping phase – focused on identifying production improvement opportunities, quantifying their potentials and formulating an activity plan to capture them - and the Digital Factory Realization phase – focused on finding technology solutions to implement the activity plan and on coordinating the implementation activities if needed.

The program is co-financed by Industriens Fond which is covering, for all the 21 companies joining it, 60% of the cost of the consultancy hours they receive from FORCE Technology consultants, while Aalborg University is responsible for translating the experience gained from the program into generalizable knowledge to better understand and support digital innovation in SMEs.

If you are interested in joining the program as a small- and medium-sized Danish production company, you can contact Michele Colli (Head of Digital Production, mic@forcetechnology.com) or Jens Ulrich Nielsen (Chief Consultant, jeun@forcetechnology.com). If you are interested in including the Digital Factory Acceleration program in an industry event, you can contact Iryna Møller (Administration, imo@forcetechnology.com) or Lennart Oleg Larsen (Head of Sales, lol@forcetechnology.com).

About the authors



Michele Colli
Ph.D., M.Sc.
Head of Digital Production
FORCE Technology
mic@forcetechnology.com



Sofie Larsen
M.Sc.
Specialist
FORCE Technology
sfla@forcetechnology.com



Xenofon Apostolou
M.Sc.
Specialist
FORCE Technology
apos@forcetechnology.com

Figures from FORCE Technology and Baden-Jensen