



OECD Digital for SMEs Global Initiative

In practice

BEYOND AUTOMATION, A GERMAN TEXTILE SME'S HYBRID APPROACH TO SMART MANUFACTURING

Rohleder, a family-owned textile manufacturer in Germany, has embraced a balanced digitalisation journey to enhance sustainability, improve efficiency, and remain competitive in a highly specialised sector. By combining traditional craftsmanship with innovative technologies, the firm has implemented various digital tools and collaborated with universities to optimise processes, address environmental challenges, and modernise its operations.

● Keywords

SMEs | Entrepreneurship | Innovation | Digital Skills | Government Support | Digital security

Background

Rohleder is an independent German textile manufacturer with over 75 years of experience, producing high-quality, made-to-order fabrics for furniture and decorative purposes. With a workforce of approximately 170 employees, the medium-sized business operates primarily as a Business-to-Business (B2B) supplier, shipping custom textiles globally. Additionally, the company offers a small home collection of finished consumer goods, including cushions and small furniture, which represents about 5-10% of its total revenue. Rohleder's success stems from its ability to adapt and innovate while maintaining traditional production methods. It produces a highly diverse range of textiles, requiring a careful balance between technological modernization and the expertise of skilled workers.

Challenge

Like many SMEs in the manufacturing sector, Rohleder has faced several operational and external challenges that have required a careful balance between modernisation and preserving its long-standing expertise. The company operates in a highly fragmented market, where it must differentiate itself from large-scale manufacturers that produce textiles in bulk. Unlike mass-production firms that benefit from economies of scale, Rohleder's strength lies in its ability to manufacture highly customised textiles, often with frequent design changes and small production runs. However, this level of diversity presents limitations when adopting modern automation technologies. Many AI-driven production tools are



developed for high-volume, repetitive manufacturing and are not well suited to Rohleder's flexible production model.

In addition to these technological constraints, Rohleder has had to navigate rising operational costs stemming from the COVID-19 pandemic and geopolitical conflicts, both of which have led to energy price surges and supply chain disruptions. As a textile producer, Rohleder relies on a steady supply of high-quality yarns sourced from various European suppliers. Maintaining consistent supply chains while managing rising costs has been an ongoing challenge. At the same time, the company remains committed to sustainability goals, including reducing textile waste and improving energy efficiency, which require long-term investments.

Modernising legacy processes has been another key challenge. Some of Rohleder's older production machines remain highly adaptable, allowing for manual adjustments that newer, fully automated machines cannot accommodate. Replacing these machines with the latest technology is not always a viable solution, as modern equipment may lack the customisability and control required for delicate textile production. Consequently, Rohleder has had to selectively integrate digital tools to improve efficiency while ensuring that its traditional production strengths remain intact.

Digitalisation Path

Rohleder has taken a measured and strategic approach to digitalisation, ensuring that its adoption of new technology aligns with its business model and production needs. While many SMEs struggle with implementing digital tools due to cost or complexity, Rohleder has successfully leveraged university partnerships and government funding to support its transformation.

The company's digitalisation journey began with improvements in basic business operations. The transition from a manual, paper-based invoice system to a fully digital process was an early step that reduced inefficiencies and paper waste. Additionally, the company integrated ChatGPT into its sales department, allowing employees to draft more effective emails, manage customer queries, and resolve issues more efficiently. These seemingly small changes have contributed to smoother internal operations and an improved customer experience.

On the production side, digitalisation has played a significant role in process optimisation. University-led digitalisation projects have enabled Rohleder to analyse weaving efficiency by collecting and interpreting machine data. These efforts have resulted in tangible improvements, such as a 20% increase in weaving productivity and a reduction in machine stoppages. Additionally, the company invested €1 million in a cutting-edge warping machine, which has reduced warp preparation time from one hour to just 20 minutes, significantly enhancing operational efficiency.

Rohleder has also assessed the potential of AI-driven quality control for its textile inspection processes. However, after careful evaluation, the company determined that existing AI solutions were unsuitable for its needs. Current AI-powered quality control systems rely on pattern recognition, which is effective for large-scale, repetitive production but less reliable in Rohleder's custom, small-batch manufacturing environment. As such, the company has opted to prioritise digital investments that yield measurable efficiency gains while preserving its core strengths in craftsmanship and flexibility.

Rohleder's digitalisation strategy aligns with broader trends in Smart Manufacturing, which is defined as the integration of advanced technologies and data-driven processes to enhance efficiency, productivity, and flexibility in manufacturing operations (OECD, 2024[1]). By leveraging machine data to optimise weaving efficiency and investing in IIoT-driven process improvements, Rohleder aligns with industry shifts towards



sensor-equipped machinery, cloud-based data analysis, and remote equipment control (Taylor, Baron and Schmidt, 2015[2]) (MRPeasy, 2022[3]) (Mittal et al., 2019[4]). While the Smart Manufacturing market is projected to grow 13% annually until 2030 (Forbes, 2023[5]), many SMEs remain hesitant to invest, with only 50% willing to adopt smart technologies despite recognising their competitive advantages (SME, 2022[6]).

Government Support

Rohleder has successfully leveraged government funding and academic partnerships to drive its digital transformation. The company has received state funding for research projects, particularly those related to sustainability and digital innovation. Grants have supported projects in upcycling textile waste, improving production efficiency, and integrating new machinery. These funding opportunities have played a critical role in helping Rohleder adopt new digital tools while managing investment costs.

To strengthen its approach to digital transformation, Rohleder has actively collaborated with universities through government-funded research projects. One such initiative focused on upcycling textile waste, where Rohleder partnered with researchers to develop furniture products made from heterogenic textile waste. This project aligns with the company's sustainability commitments and supports broader circular economy efforts within the textile industry. Another research collaboration introduced an innovative yarn recycling technique, developed by a young designer, that repurposes leftover yarns into new textile designs.

In addition, the company has benefited from government subsidies for energy-efficient upgrades, including solar panels and heat insulation systems. These initiatives have helped Rohleder reduce its environmental footprint while lowering long-term operational costs.

To learn more about SMEs digital transformation

OECD (2021), *The Digital Transformation of SMEs*, *OECD Studies on SMEs and Entrepreneurship*, <https://dx.doi.org/10.1787/bdb9256a-en>.

OECD (2021), *SME Digitalisation to Build Back Better*, <https://www.oecd-ilibrary.org/docserver/50193089-en.pdf?expires=1650895216&id=id&accname=ocid84004878&checksum=53749B8E6D032F7C164B559578354381>

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- [6] SME (2022), *SME, CESMII Release 2022 Smart Manufacturing Market Survey*, <https://www.sme.org/aboutsme/newsroom/press-releases/2022/sme-cesmii-release-2022-smart-manufacturing-market-survey/>.
- [2] Taylor, R., D. Baron and D. Schmidt (2015), "The world in 2025 - predictions for the next ten years", *2015 10th International Microsystems, Packaging, Assembly and Circuits Technology Conference (IMPACT)*, <https://doi.org/10.1109/impact.2015.7365193>.



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