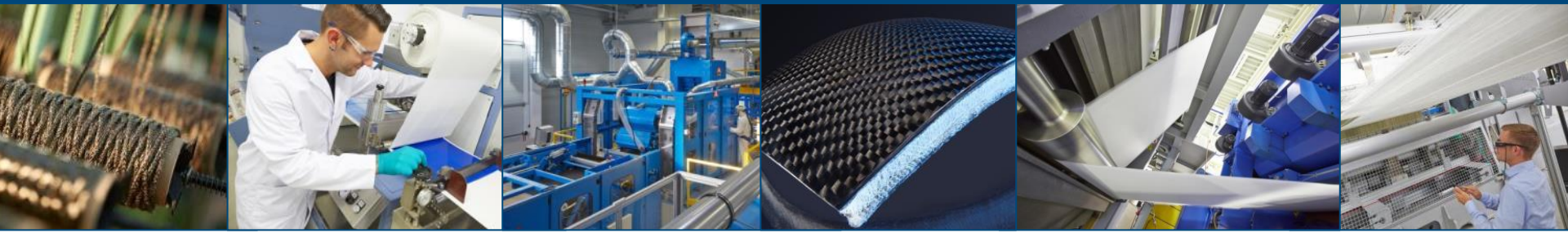
SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.



Industrialization and Information Conference of China Textile Industry

14. September 2018 – Dalian CN

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ZUSE-GEMEINSCHAFT
FORSCHUNG, DIE ANKOMMT.

SIG
Sächsische Industrie-forschungsgemeinschaft e.V.

Verband Innovativer Unternehmen e.V.

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Quelle: commons.wikimedia.org- National Archives and Records Administration

Quelle: www.letsgrowtogether.be/de/content/getzner-textil | Picanol B.V. Ieper – Getzner Textil GmbH Gera

Tomorrow ?

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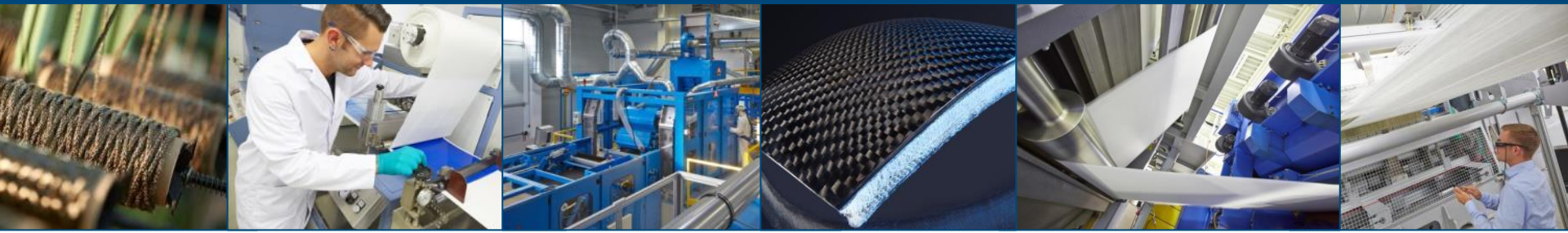

Digitalization in the Textile Industry

Dirk Zschenderlein

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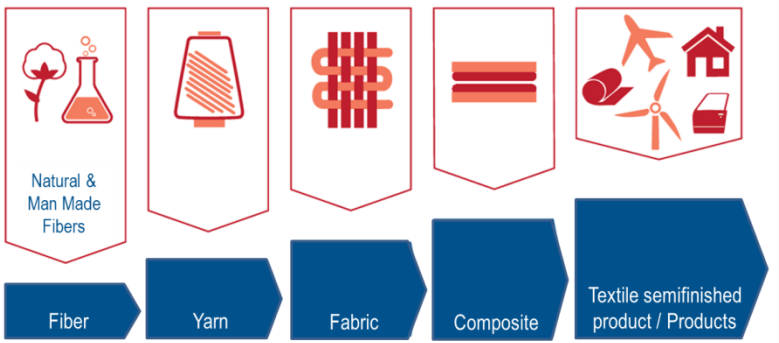
Saxon Textile Research Institute (STFI)

We are innovation partner und service provider for our customer (companies, associations, institutes, etc.)

Saxon Textile Research Institute (STFI)

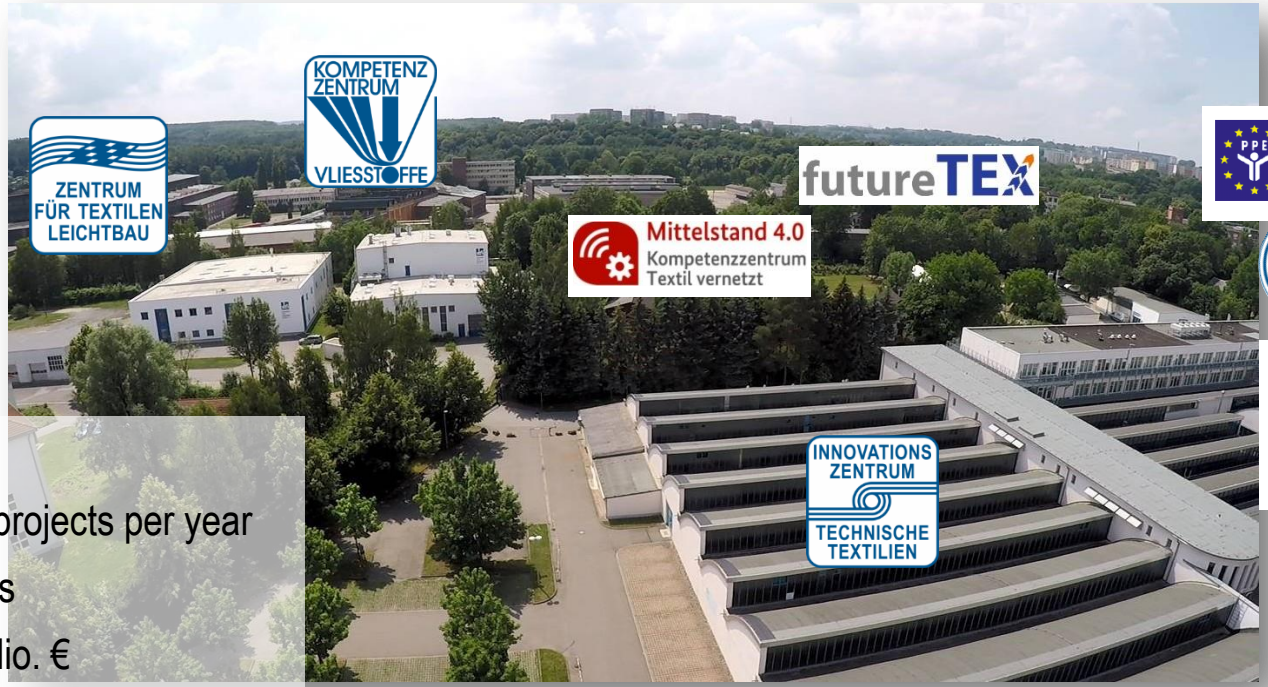
We work on interdisciplinary topics

Filtration	Protective clothing	Textile construction	Industrie 4.0	Project-management
Recycling	Lightweight construction	Natural fibers	Smart Textiles	…



Saxon Textile Research Institute (STFI)

We have emphases in technologies

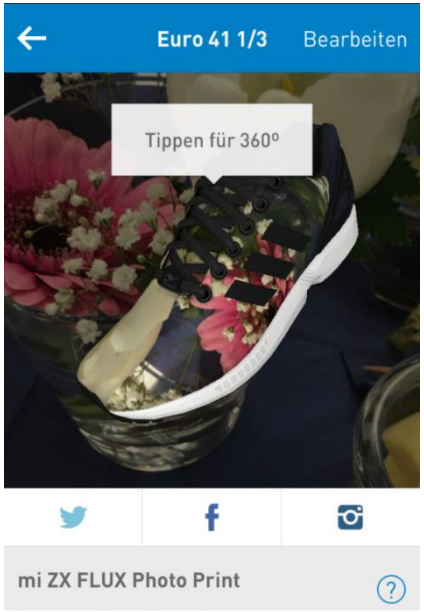


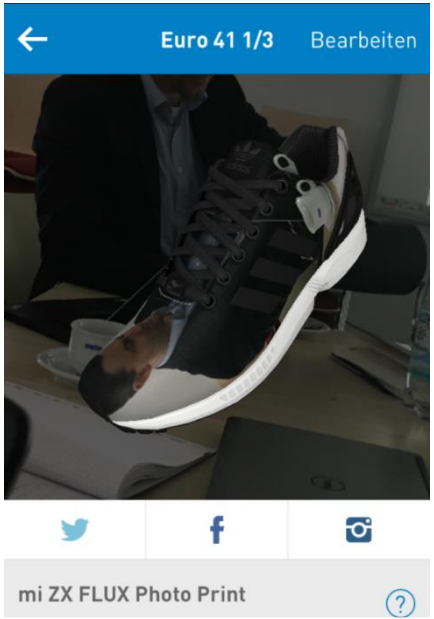
Key facts

- 120 research projects per year
- 145 employees
- Turnover 17 Mio. €

Digitalization in Textile Industry

Examples of success





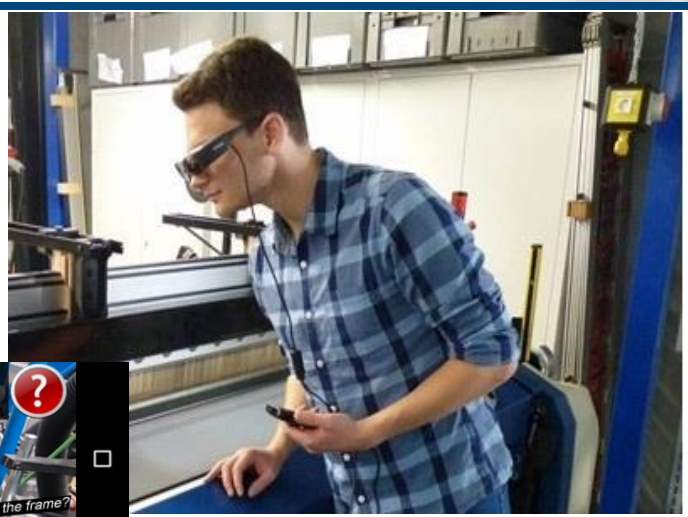
Quelle: Gloy, Y.-S; Automation and the workforce; WTiN Textile 4.0 Conference, Amsterdam 26.10.2017

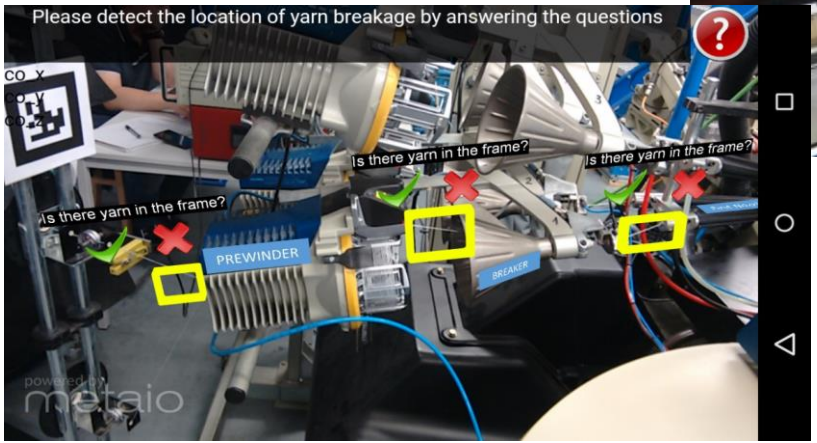
Examples of success - Adidas Speedfactory

Video

Quelle: Gloy, Y.-S; Automation and the workforce; WTiN Textile 4.0 Conference, Amsterdam 26.10.2017 (www.youtube.com/watch?v=mOghawCYxM8)

Examples of success





Quelle: Gloy, Y.-S; Automation and the workforce;
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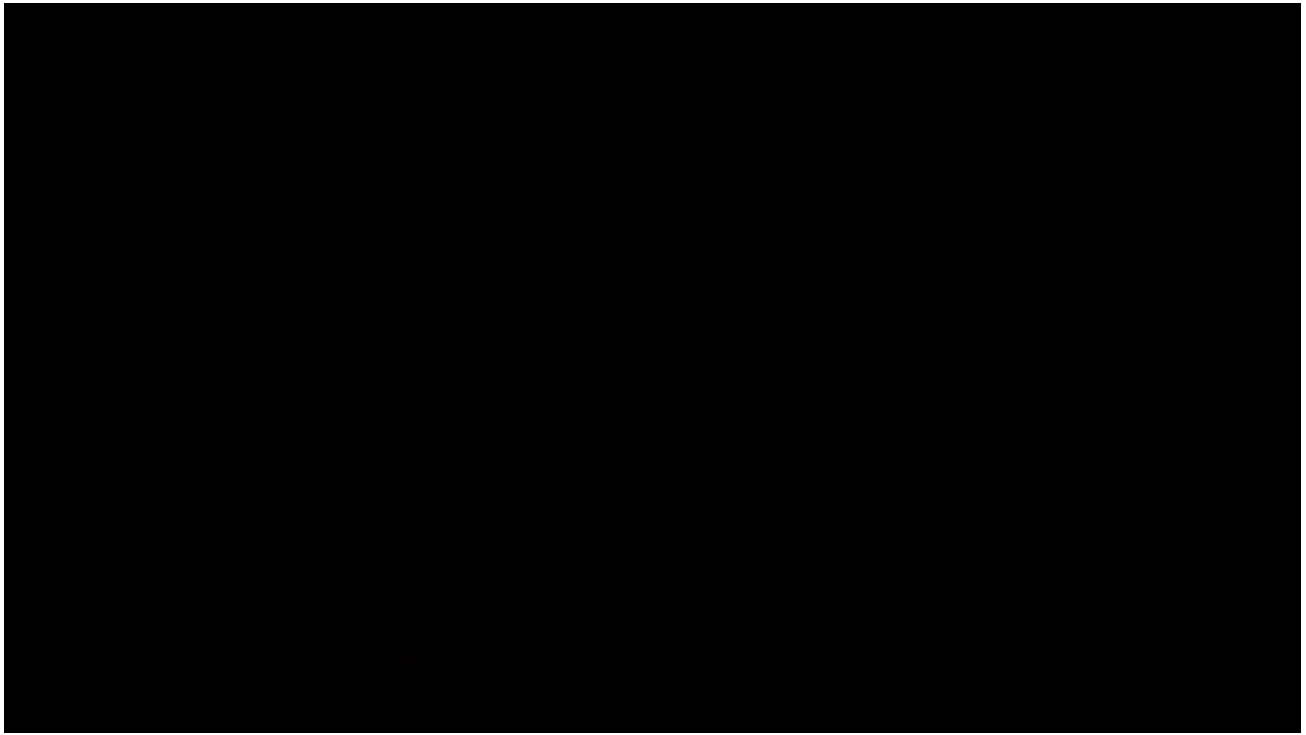
Examples of success – Adidas Storefactory



Video

Source: Gloy, Y.-S; Automation and the workforce; WTiN Textile 4.0 Conference, Amsterdam 26.10.2017 (https://www.youtube.com/watch?v=WchZ-05TbP4)

futureTEX

The Textile Industry as a future model for traditional branches

futureTEX supports the technical textile industry - TechTex - in the transition to a sustainable industrial player

Vision

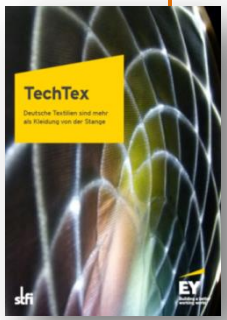
- Our vision is to maintain the competitiveness of the textile industry. The industry is becoming one of the most modern value-added networks for the production of technical textiles, nonwovens and composites.
- It is based on **product innovations** with disruptive character, **efficient production technologies** and **modern forms of organization** in the age of digitization.

Strategy

- Change to a competence pool with a cross-sectoral approach to achieve the goals in the areas of TechTex and Textile machinery
- Expansion of a leading position in the global TechTex market by 2025 by focusing on disruptive innovations and future-oriented sectors of the industry

Objectives futureTEX

- futureTEX is an interdisciplinary network of excellence, consisting of partners form industry and research.
- The aim is to support the transformation of the traditional textile industry into the age of digitization.



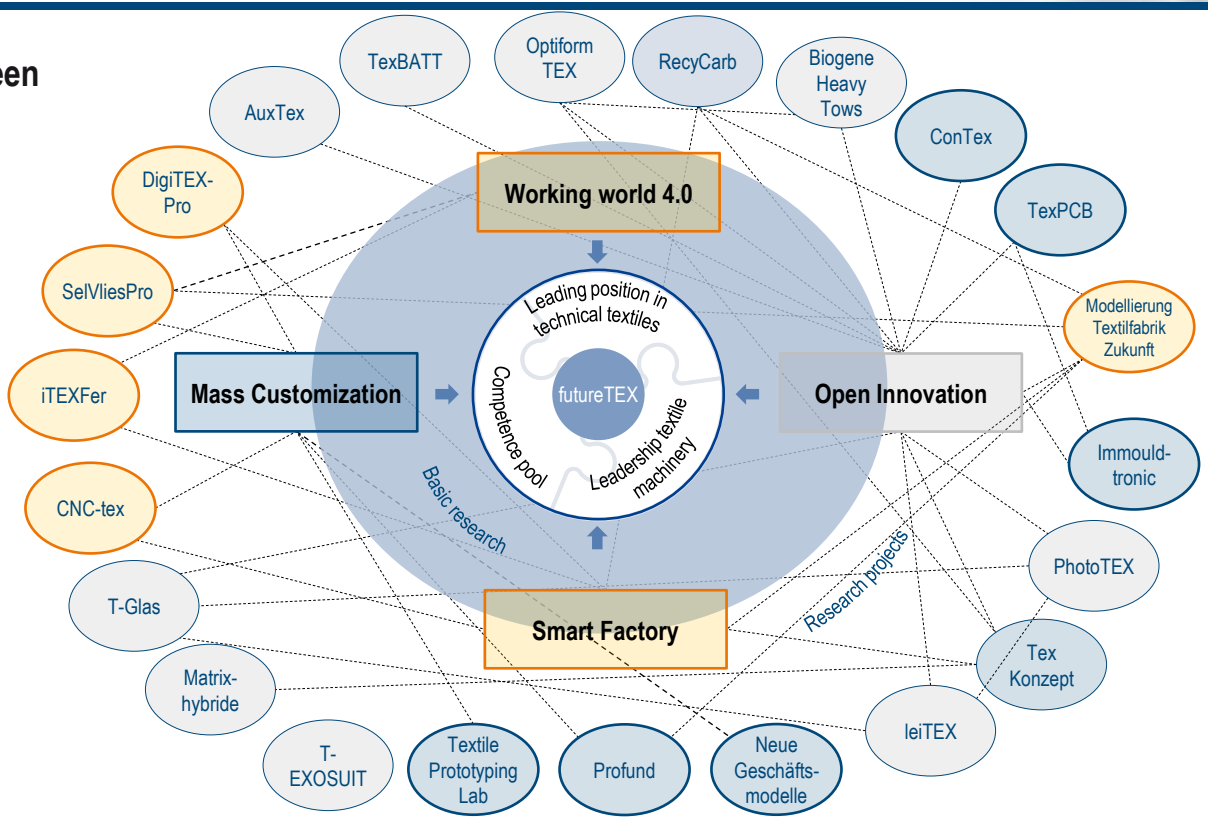
Published in the paper „TechTex“

SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.

Twenty20 project futureTEX

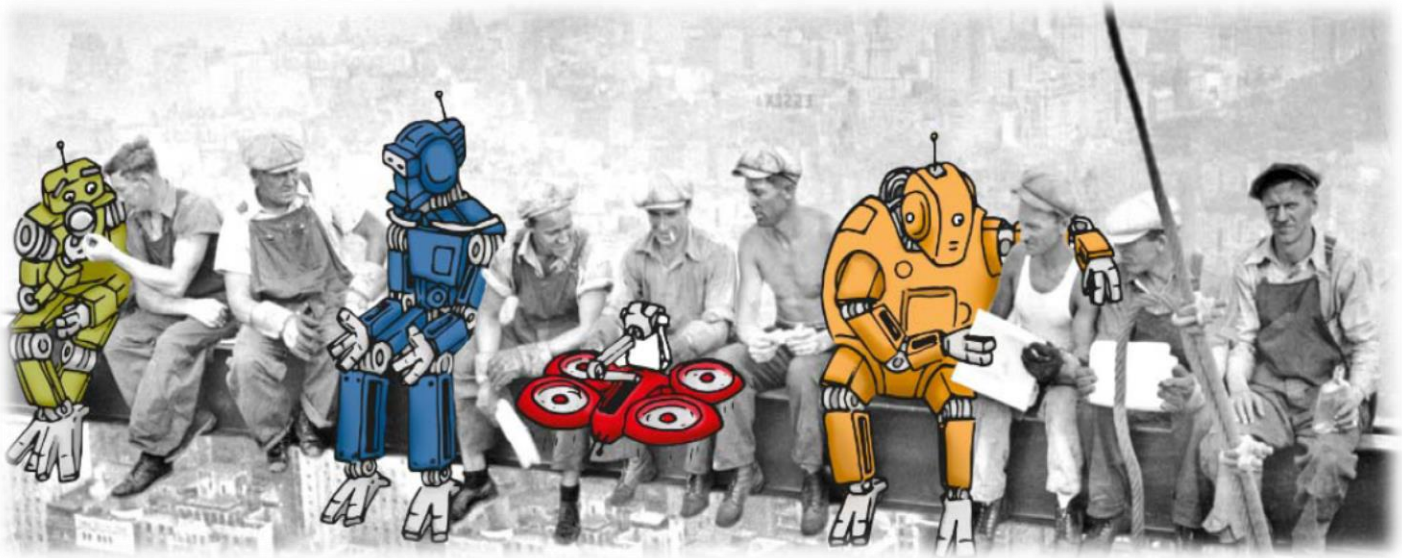
Focus and interaction between futureTEX - projects

- Digitalization of production
- Using of digital technologies
- Disruptive product innovations



Working world 4.0

New and crazy? Or everything as before?



© www.netzoekonom.de

Working world 4.0

Goals from the point of view of corporate management
(example usage of service robotics)

50% of companies see increasing efficiency, productivity and flexibility first

44% of companies want to facilitate or enhance human work

30% of companies want to replace human work

Source: ZEW Branchenreport Informationswirtschaft, 07/2017

Currently no decline in employment due to digitization visible

Digitalisation has created more jobs than it has destroyed

Source: IW Köln, IW-Report 11/2018

Working world 4.0

Workplace 4.0

Work activities

Work organization 4.0

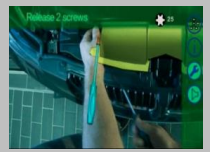
Organization

Influence to…

- Assembly

- **Machine operation**

- Maintenance



- Logistic

- Testing

Working world 4.0

Application: Operation of weaving machines

Use case description

- Different employees with different tasks have the ability to maintain the machine from any place

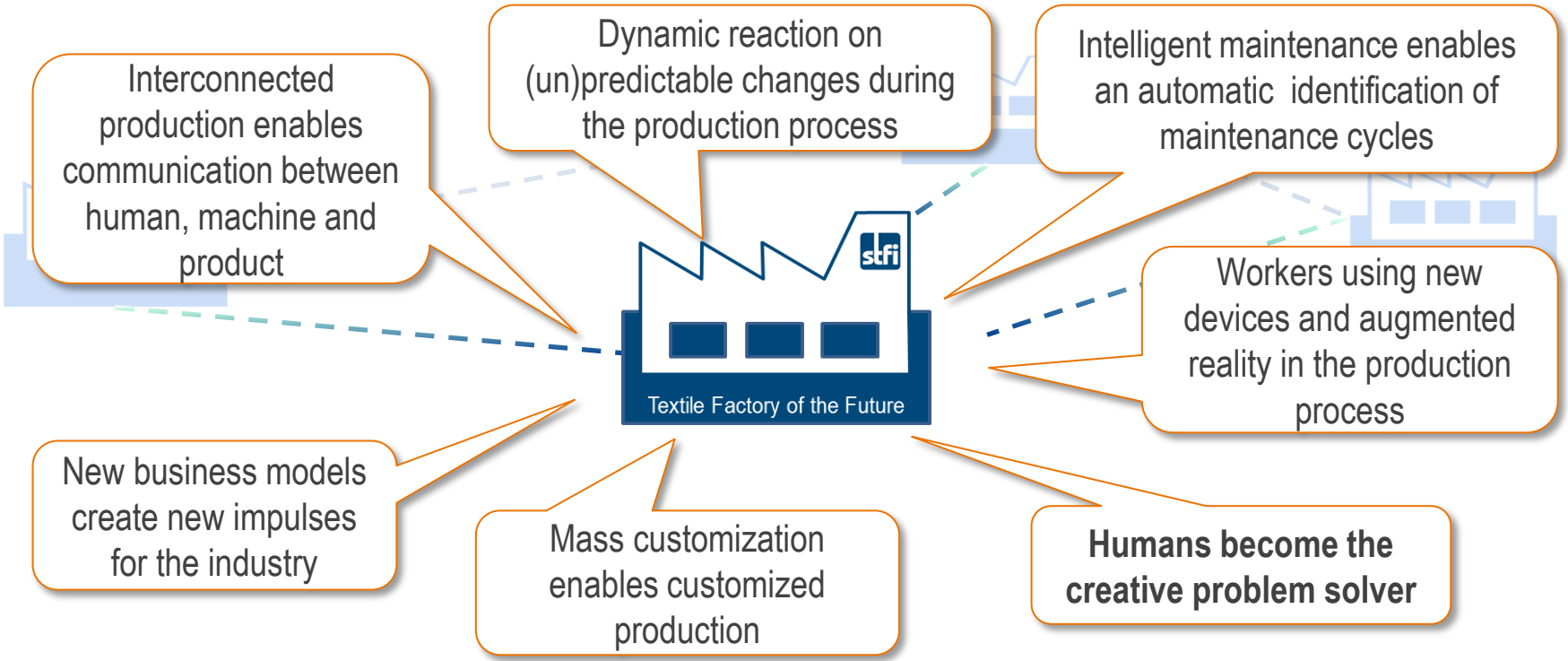
Benefits

- Reduction of path to walk
- Easier overview of machine status
- Improved decisions through improved and faster information

Working world 4.0 - Maintenance orders via SmartWatch

Smart Factory

Behind the vision - the Smart Factory



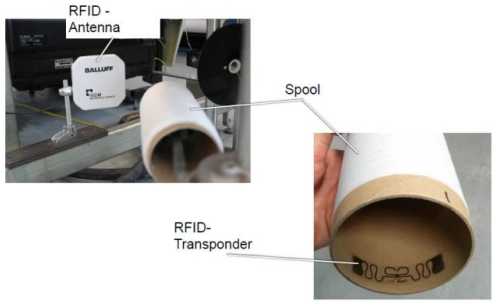
Smart Factory

Smart Factory

Products / work pieces in the smart factory are characterised by:

- unique identification
- permanent tracking
- knowledge of the current status in the production process and the next or alternative steps

Example: material identification at a weaving mill



Source: ITA / STFI

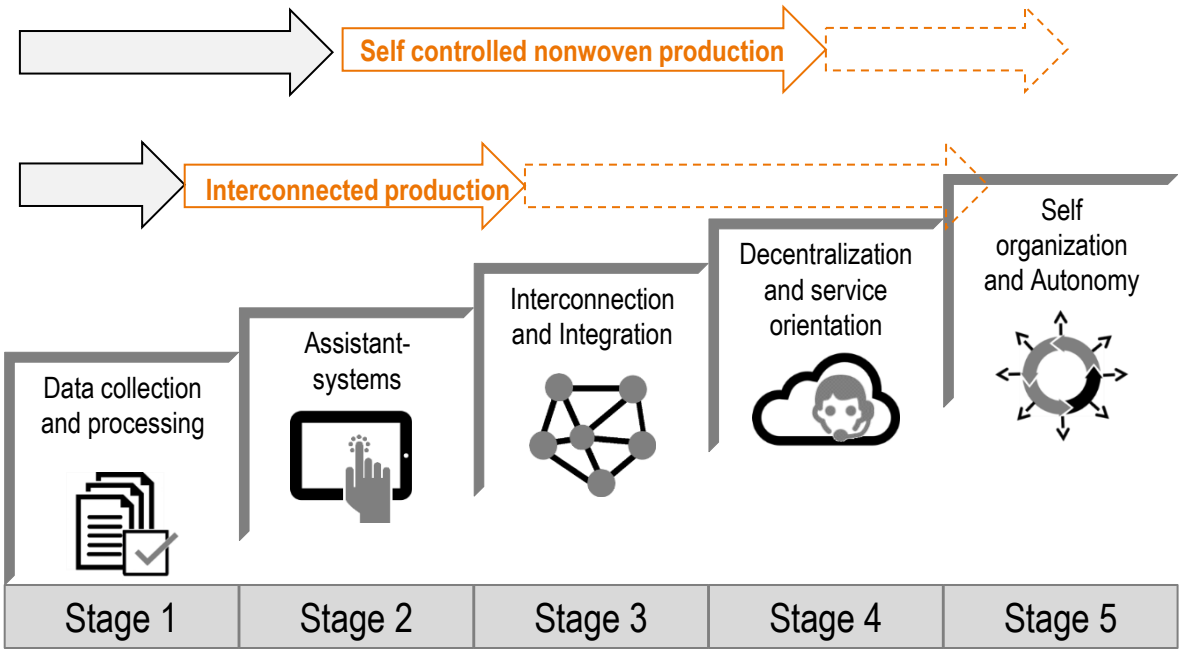
futureTEX - Research and experimental field

Different conditions in the textile industry

Single-stage production line for nonwoven production
Continuous production with a high level of automation

Multi-level production chain from yarn production, surface formation, finishing, ready-to-wear
Discontinuous production with lower level of automation

Level of automation



Stages of Industrie 4.0 (Bauernhansl, Kürger, Reinhart, & Schuh, 2016)

Self controlled nonwoven production

Human machine interaction

I4.0-cross-stage teaching and training concept

Decentralized decision-making through a technologically self-optimizing production line

Intelligent maintenance

Source: STFI e.V. Chemnitz www.stfi.de | project futureTEX www.futureTEX2020.de

Interconnected production

(collaborative) robots as high efficient production systems

Production of mass customized product

Smart logistic systems (Driverless transport system)

RFID Communication between machine and material

Quality control and technology modelling

Material flow simulation - for planning in production operation

Interconnection for product configuration and machine parameters

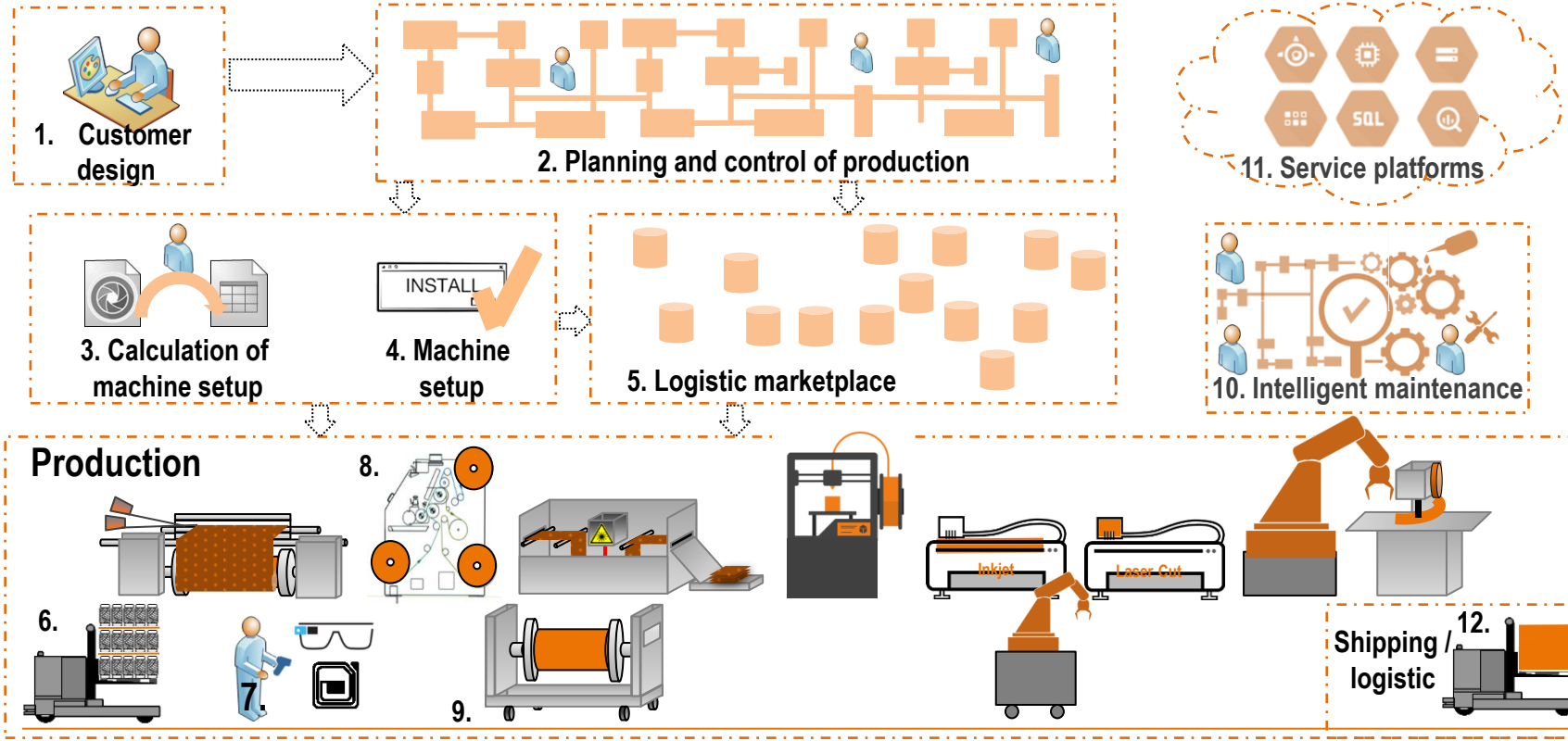
Assistance systems

Service platform for assistance and maintenance systems

Self-organizing logistics order control

Source: STFI e.V. Chemnitz www.stfi.de | project futureTEX www.futureTEX2020.de

Interconnected production – process flow



Source: STFI e.V. Chemnitz www.stfi.de | project futureTEX www.futureTEX2020.de

Examples

Research and experimental field – Creel for warp material

Demonstrator

Stage 1

Assistance systems for context-sensitive data providing

- Role-specific and user-relevant provision of data
- Visualization of information supports employees
- Use of mobile devices such as smartphones, tablets, data glasses, etc.
- Guidance for non-value adding activities (eg maintenance)

- ✓ Faster information provision on site
- ✓ Information in real time
- ✓ Greater data security through different user roles
- ✓ Reduction of possible sources of error
- ✓ Reduction of personnel costs due to shorter reaction times

Demonstrator

Stage 2

Assistance in maintenance

- Site-specific provision of information on mobile devices during maintenance activities
- Identification of the current position via QR codes
- Information about required work steps
- Notes on special features of individual units

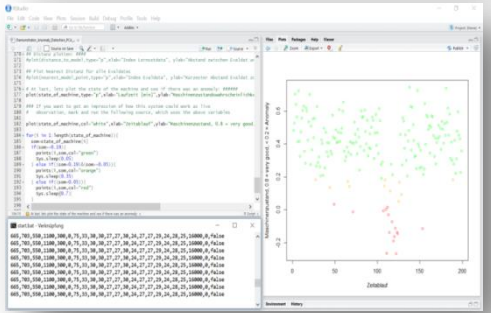
- ✓ Time savings in information search
- ✓ Reduction of travel times
- ✓ Traceability through documentation of work steps
- ✓ Reduction of personnel costs due to lower maintenance
- ✓ Cost savings through increased machine availability

Demonstrator

Stage 1

Machine data analysis

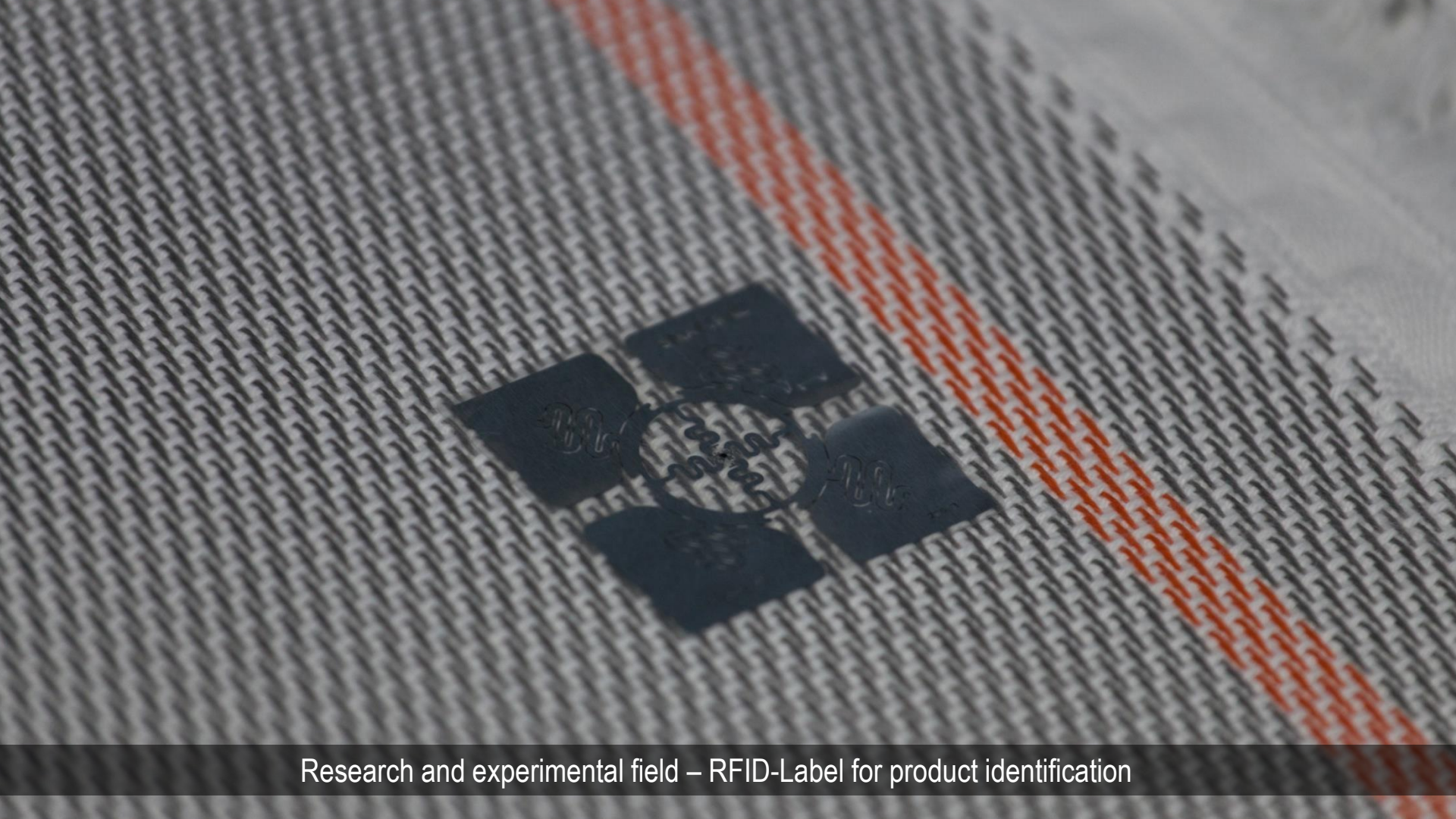
- Use of Industry 4.0 communication protocols for machine data acquisition
- Big data approaches for analysing large, sometimes unstructured data volumes
- Detecting relationships between parameters for (predictive) problem detection



- ✓ Efficient machine data acquisition and evaluation
- ✓ Improved process quality through early problem detection
- ✓ Increased system availability
- ✓ Reduction of downtime

Research and experimental field – Bobbins with RFID label for faultless assembly of the loom

Video Research and experimental field – Bobbins with RFID label for faultless assembly of the loom



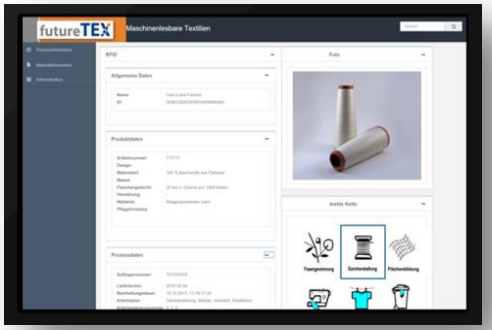
Research and experimental field – RFID-Label for product identification

Demonstrator

Stage 1

Machine readability of textile substrates

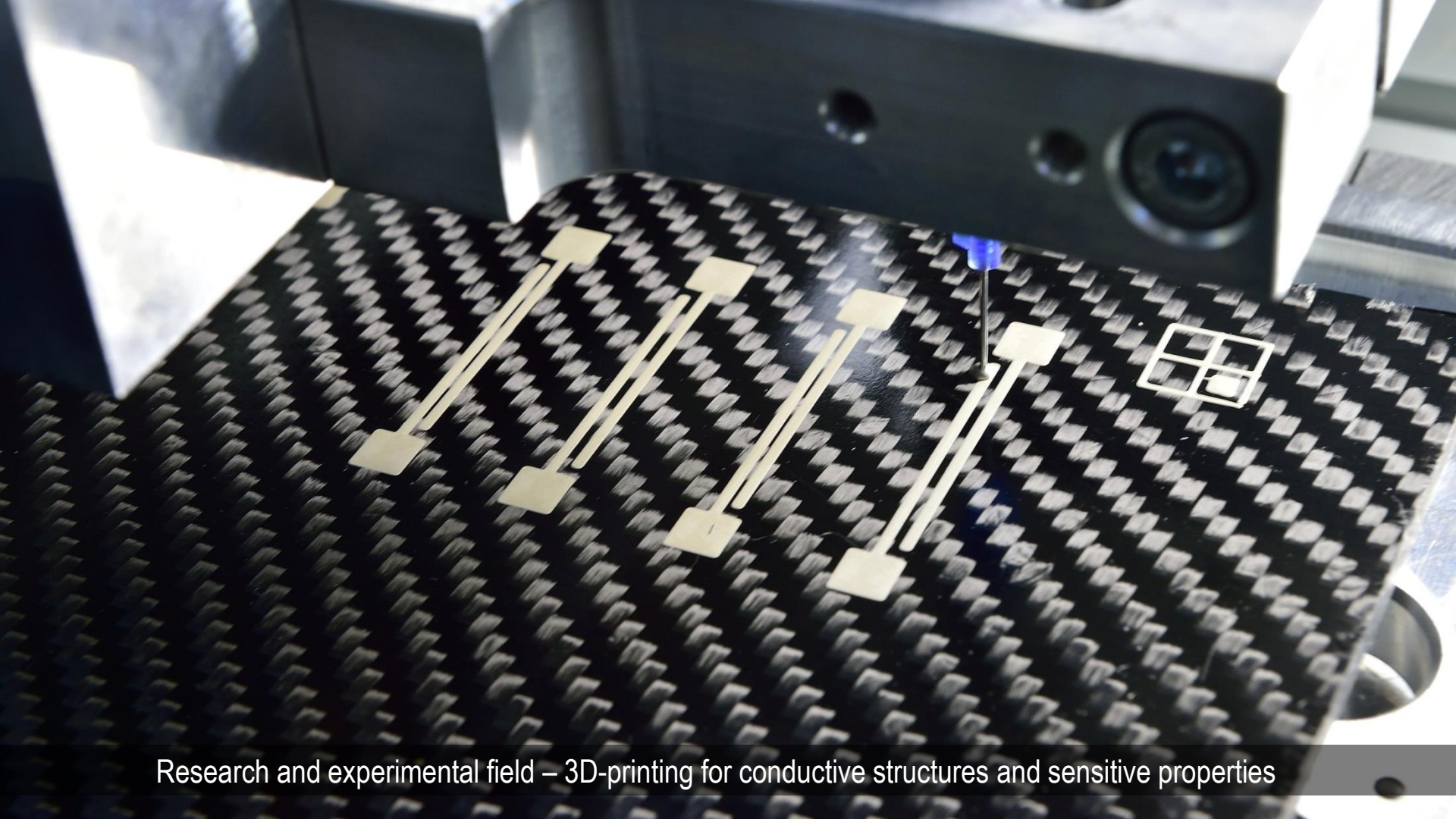
- Use of wireless communication technologies along the textile chain
- Raw materials and products receive unique ID for further information (eg order number, delivery date, routing, material information and quality data)
- Control of the production process by the product within specified limits



- ✓ Automated, faster capture of booking transactions
- ✓ Increase process transparency
- ✓ Avoiding bad bookings or wrong assemblies
- ✓ Reduction of personnel costs by reducing manual bookings
- ✓ inventory optimization

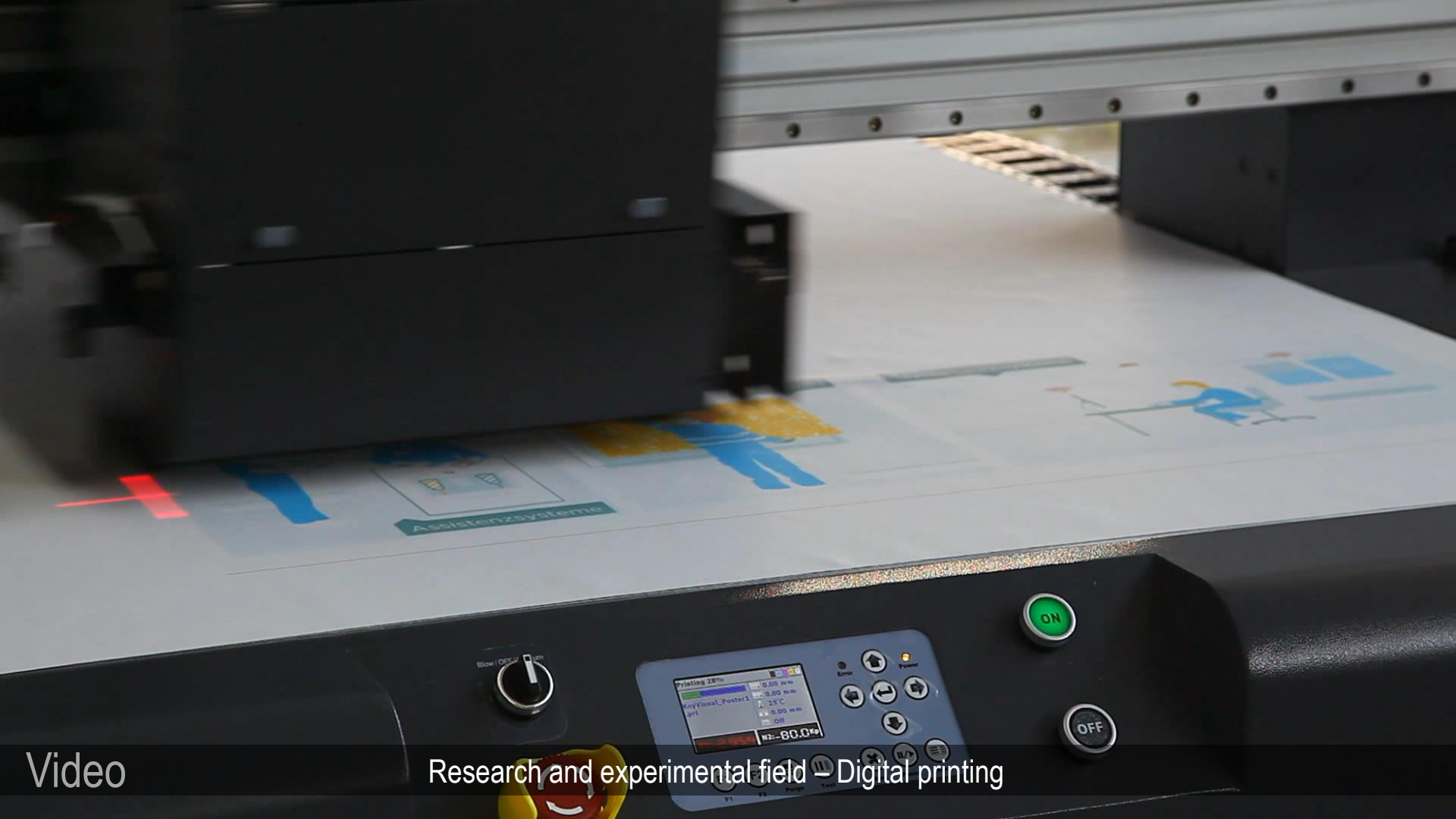
Video

Research and experimental field – RFID-labeling during the production process



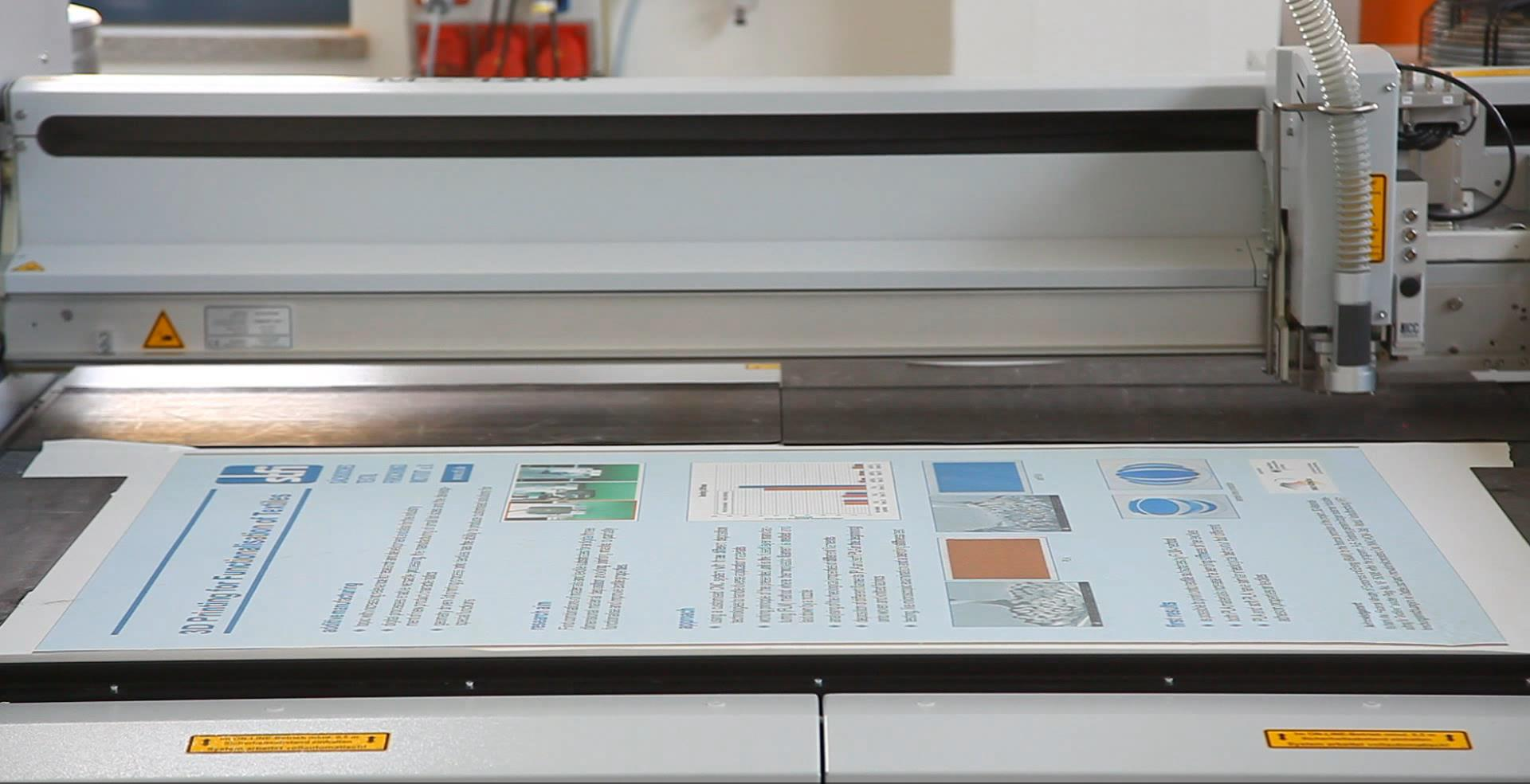
Research and experimental field – 3D-printing for conductive structures and sensitive properties

Video Research and experimental field – 3D-printing for conductive structures and sensitive properties



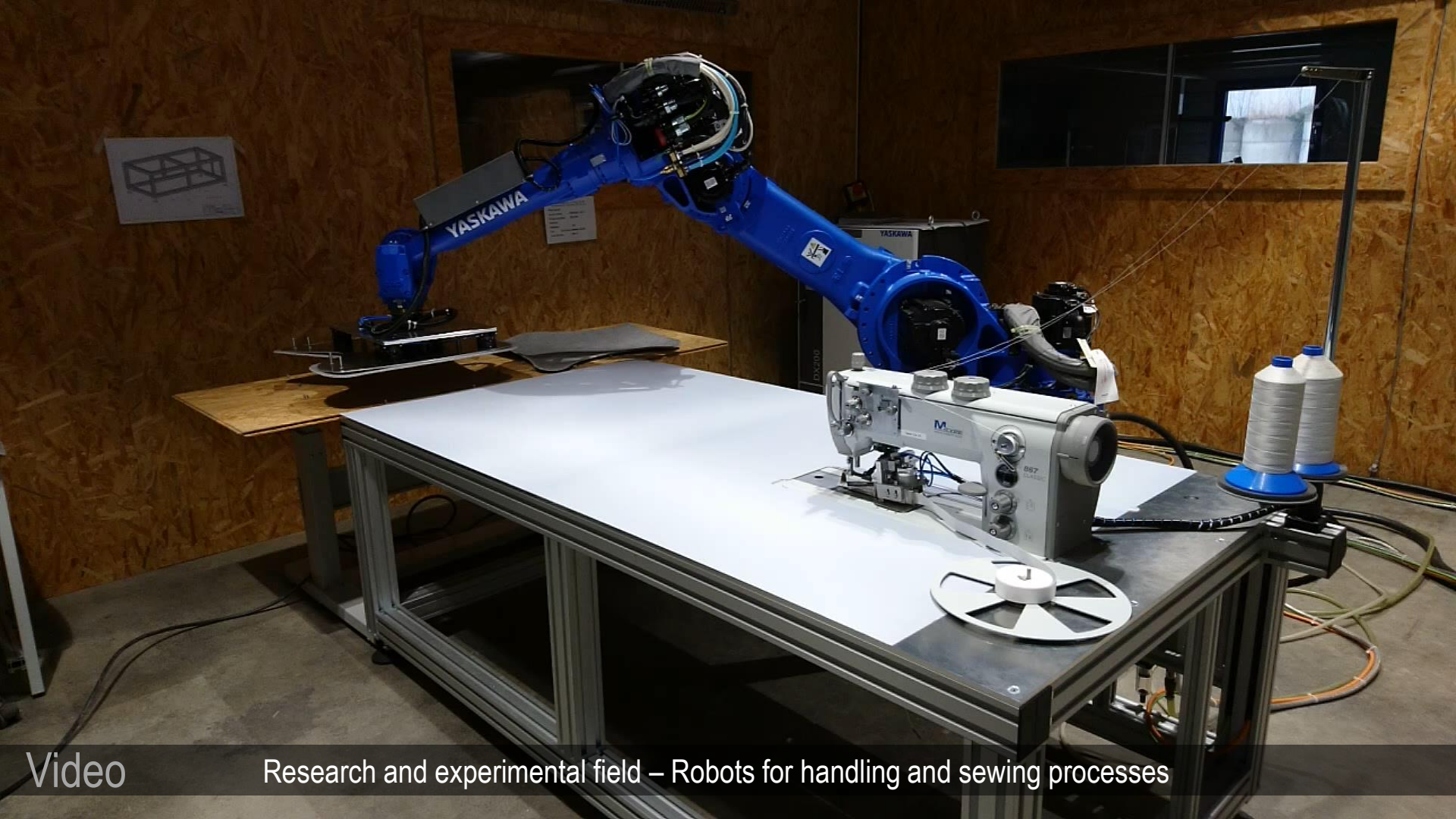
Video

Research and experimental field – Digital printing



Video

Research and experimental field – Lasercutter



Video

Research and experimental field – Robots for handling and sewing processes

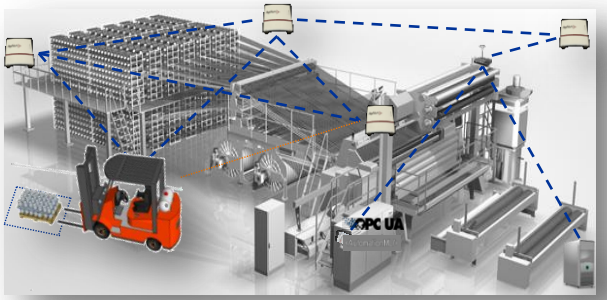
Video Research and experimental field – Location of employees for site-specific provision of information

Demonstrator

Stufe 1

Real Time Locating System for object monitoring

- Indoor localization of materials, people and equipment using ultrawideband technology
- Site-specific provision of information and triggering of actions
- Monitoring of sensitive areas or workplaces with special risks



- ✓ Reduction of search times
- ✓ Optimization of running and transport routes
- ✓ Optimization of transport and logistic processes through traceability
- ✓ Increased safety in sensitive areas
- ✓ Avoidance of unnecessary capital tie-up by warehouse monitoring by combination with RFID technology

Why we do this ?

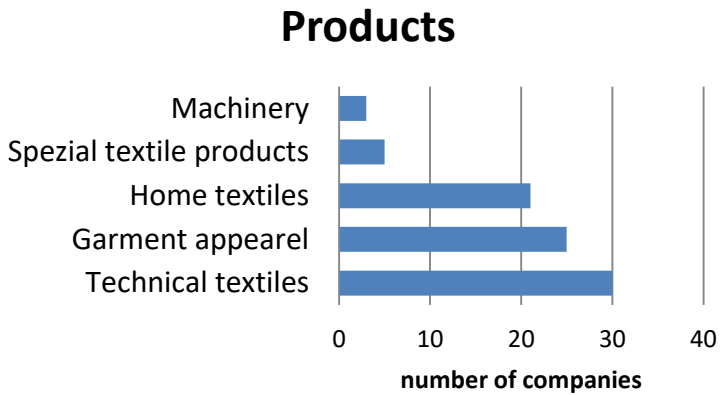
Increase production efficiency

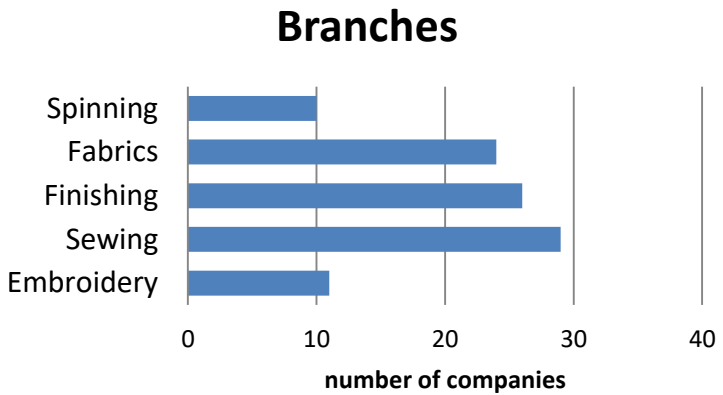
- Efficiency
- Starting time
- Energy saving
- Material, quality
- Capacities
- Staff
- Area
- etc.

Reference: http://blog.iao.fraunhofer.de

Industrial situation – textile industry

Survey: Situation in the textile industry in East-Germany

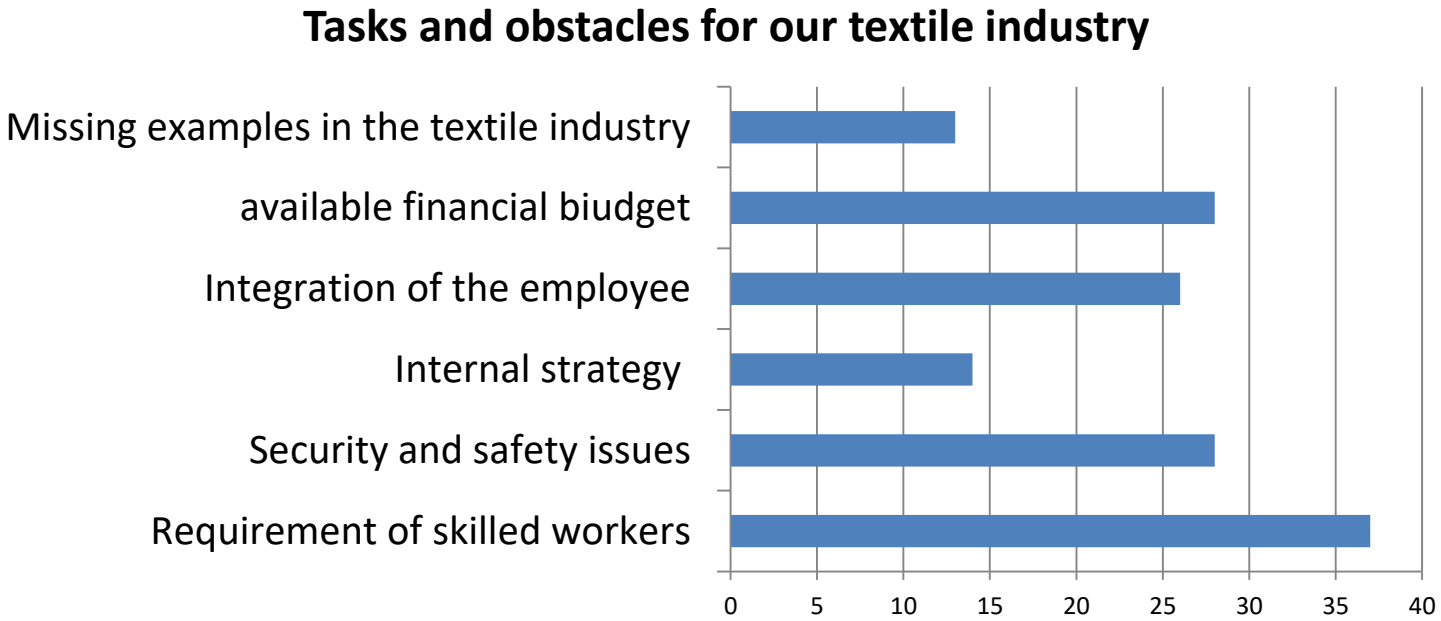




Sorce: own study

Industrial situation – textile industry

Survey: Situation in the textile industry in East-Germany

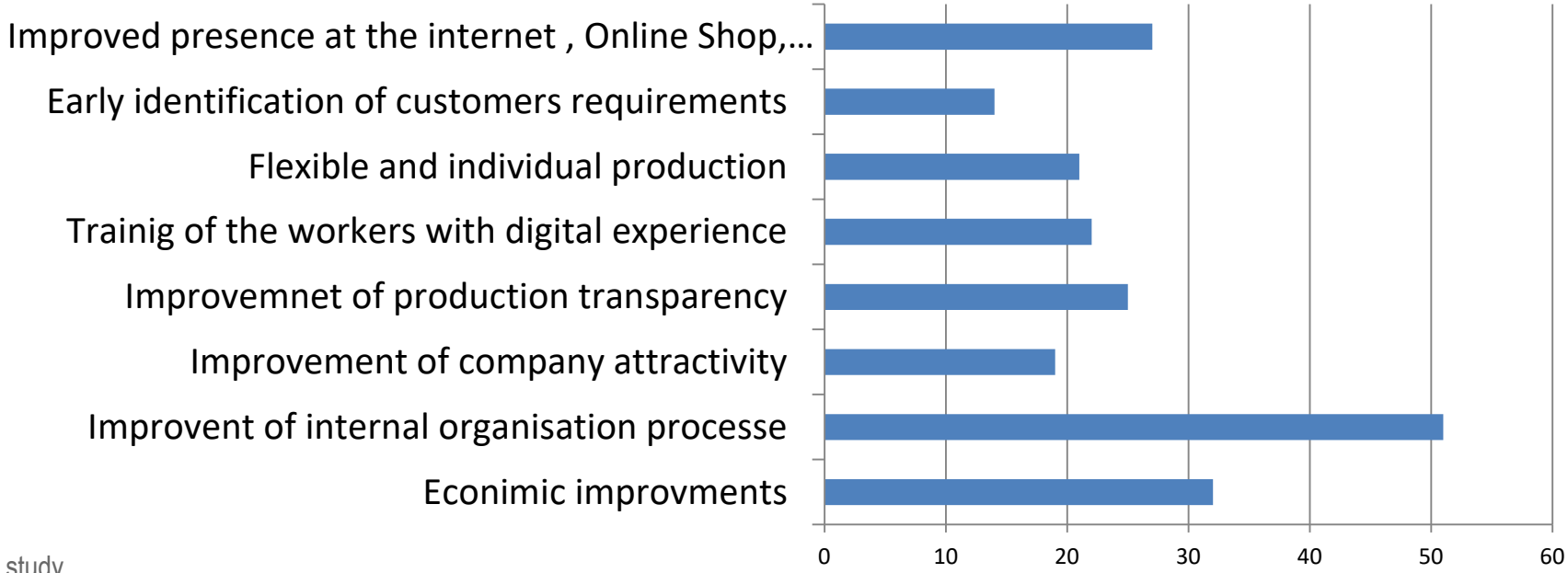


Sorce: own study

Industrial situation – textile industry

Survey: Situation in the textile industry in East-Germany

Expectaion of textile companies by using digital solution



Sorce: own study

Summary and outlook

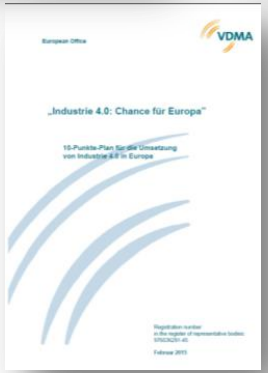
Expert study

- German companies want to create with Industrie 4.0 projects new **business opportunities** and **strengthen there own position**

Conditions for the success of such projects

- Technical basics
- Know-how
- Determining your own position
  - Where am I today?
  - Where I want to be?

Summary and outlook



- Implementation of Industrie 4.0 step by step
- Basic technologies available
- But: many companies are still at the beginning

Thank you for your attention !

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