textil+mode

Perspectives 2035

A guide to the textile future

Forschungskuratorium textil

Summary

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Executive Summary

In the beginning of the 2020s Germany's textile sector has a superb position in the international competition. With a dense and closely linked network of university and non-university research institutions Germany is one of the leading textile innovation locations. Textile research is strongly **interdisciplinary**. Thus, in important application areas in Germany there is a strong focus on textile topics. Interdisciplinarity, an **intense research activity of private sector companies** and the strong network of textile research institutes with the industry are basic requirements for a development oriented on market needs and the successful knowledge transfer from theory into practice.

With regards to the content the German research landscape is **broadly positioned**. Companies and research institutes work on subjects that are being researched with high interest worldwide. In key future fields Germany's research activity is especially intense. The application fields of **medicine and health** with monitoring textiles, **energy storage** to be used in Smart Wearables or **functionalising natural fibres**, for example to be used instead of carbon or glass fibres in compound materials count toward that.

That gives the German research and development sector the **best prerequisites** to survive in an environment constantly changing in respect of society, regulations and competition. To keep that status it is essential that industry, science, associations and politics recognize future changes in time and react accordingly.

The textile sector will face strong pressure to adapt in the coming years. Rising energy costs, shortening development cycles and new customer requirements even more focused on sustainability will be great challenges for textile companies as well as for research institutes. In the context of an aging society, more recognizable **environment and climate changes**, **densification of urban spaces** as well as increasing prosperity in former development and emerging countries new markets for textile applications will rise, contributing to a society, living more sustainably, healthier and conscious.

Despite the already close network of science and industry this background will make it necessary for the textile sector to increase the **speed** of development and adaption of digital as well as sustainable processes and to intensify its **cooperation** with important user industries.

With the beginning of the 2030s legislation as well as customers demand pattern will have changed considerably. Companies not able to keep up with the dynamics of **digital and sustainable transformation of the textile value** chain will probably disappear from the market.

1 Short term changes

Socio-economic framework conditions

- For more and more parts of our society the consciousness for **sustainability** becomes an essential motivation for political action and conusmer decisions.
  - **Pressure to adapt on the cost side:** rising CO_2-costs will become critical and reach existential thresholds for some enterprises.
  - **Pressure to adapt on the consumer side:** customers will increasingly ask for sustainably produced products and will want to have more transparency, while not going up in price much.
  - **Pressure to adapt from the capital market:** Sustainability plays a stronger role in investment decisions.
- Especially on B2C-markets also **socially sustainable products** are increasingly important for customers.
- **A growing need for time off and flexibility** aggravates the situation for junior staff for the textile sector and makes it more difficult to cope with the shortage of skilled workers.

Technology development

- Increasingly **digitally simulating** textile products and processes accelerates development cycles.
- **3D-printing technology** is used more and more in prototyping.
- Competency gaps still need to be closed and uncertainties regarding the amortisation lead to partly **delayed adaptation of digital key technologies**.
- Increasing cost pressure **accelerates the adaptation of energy efficient processes**.
- Product development
  - Orientates more strongly on **customer's needs** and in developing systems instead of components,
  - Happens increasingly **cross-sectoral**, in collaboration with user industries,
  - Takes product life cycle and subsequent use of product and all components into account (**Design for Recycling**).
- **Natural fibres** (also) coming from alternative sources, for example from maritime permacultures, in-vitro-processes and residual materials from the agricultural sector and food industry, are used more often as the basic material for sustainable textiles.

New applications and business models

- Social **consciousness for sustainability starts being economically effective**:
  - New forms of mobility, for example car and bike sharing, increase the demand for innovative textile solutions.
  - Market drivers: demand for sustainably produced textiles is increasing in first user industries (automotive, home/living).
  - Campaigns of large fashion suppliers open the consumer's consciousness for sustainability as a sales argument.
  - A market for rental clothing services for leisure and sports apparel starts to develop.
- Increasing demand for **textile solutions for an aging society**.
- **Wearable Electronics**, for example in the medical field, care, work wear and **Smart Textiles**, e. g. for energy management, are accepted more by user industry and end consumer.
- **E-commerce** starts being a standard sales channel in B2B-business as well.
- Initial **data supported and hybrid business models** develop: for example rental clothing services, digital traceability services

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2 Medium term changes

Socio-economic framework conditions

- Former **development and emerging countries** will become **new markets** due to increasing prosperity, not only for the average product but for special high quality products, too.
- Additionally to the **addiction of US-technology and platform providers**, the addiction to Chinese technology and platform groups will increase, which has significant effects on the shape of distribution channels.
- **Visibility of climate changes** will be increasing dramatically.
- **Sustainability** will be a major **funding criteritum**.
- Double **acceptance threshold** until 2030:
  - Sustainability will be accepted as a major sales argument by large parts of the population.
  - Broad social acceptance also for strong political regulations in favour of climate and environment
- Strong **regulation threshold** around 2030, for example prohibition of substances that emit microplastics, fixed recycling rates, limited usage of water and biomass
- Demand for new solutions for the consequences of **urbanisation**, for example in the field of mobility, re-densification, air pollution control, water management

Technology development

- Stronger adaption of **self-learning processes**.
- Progress in the **flexible handling of textiles by robots** and in additive production processes.
- **Decreasing investment costs** for digital key technologies.
- Nearly **fully automated textile processes** up to 2030 possible.
- The progress in additive production processes makes **flexible production of smallest series** in industrial scale possible
- **Sustainable processes** for dyeing and finishing get ready for market
- Up to 2030 production is nearly possible **without water consumption or contamination**.
- **Complex textile based systems** for different application fields, such as construction, energy management, medical technology or care get ready for market

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new applications and business models

- Increasing awareness and **growing acceptance for textile based solutions**, e. g. in the mobility sector, home and living as well as in the field of construction
- Sustainable processes become effective **means of differentiation**:
  - **Longtail-business** models get realised (B2C)
  - **Separation** as an additional benefit (B2B)
- Stronger focus on the needs of end users acts as a catalyst for new value-added networks as well as the transformation from component to system production.
  - The need for coordination at the interface of value-added networks favours the development of new intermediary business models (network management).
  - Perspectively, network management organisations can become digital matchmaking and development platforms.
- (Local) digital-on-demand-production makes new business models possible.
- Pay-by-use becomes the standard accounting model for textile machines.
- New services will be based on textile competences: for example washing and processing services for functional textiles, cradle-to-cradle-services

3 Long term changes

Socio-economic framework conditions

- Changed competitive environment: former development and emerging countries produce more and more high quality technical textiles on their own
- Up to 2035: China is technically on the same level with German machine and plant manufacturers
- Consumer society in transition: changed understanding of growth and prosperity
  - Orientation towards the common good is becoming an essential trend in society.
- Complete re-traceability and transparency of all supply chains expected.

Technology development

- Existing automatisation gaps are getting closed.
- Existing challenges of interoperability are solved, even in the network between enterprises, between production plants and autonomous logistic/intralogistics companies.
- Processes for lasting finishes get ready for market.
- Processes to separate complex textile systems get ready for market.
- Textile recycling processes can be used on non-textile materials

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New applications and business models

- Customers take sustainability of products and processes for granted.
- Local, flexible, demand-oriented production is a standard business model.
- 3D-printed fashion is well received by the market at large and perspectively opens the door to the customer becoming prosument 4.0.
- Rental clothing services take over as standard distribution model in the fashion industry instead of selling clothes.
- Distribution and diversification of textile based solutions becomes more common in various user industries
- 2035: competencies in sustainability as a lever for a successful completed transformation of the sector to the production of systems instead of components

Fields of action and options

The direction presented in this study in which textile research and textile industry in Germany likely will develop until 2035, is not a future scenario that the sector would somehow be exposed to in a passive way. It is more a kind of orientation guide that discusses the different influences of social, economic and politic changes and their interaction. To make use of the described chances for the textile sector and to manage the challenges, enterprises, research institutes, associations and political deciders are asked to design the future proactively. To design the future commonly, it is important to develop the new technologies in the industry and to place them on the market that pay a long term contribution to a sustainable and healthy future worth living. This is the only way to maintain the competitiveness of Germany's textile research and textile industry facing the increasing pressure to adapt.

Textile companies

have to do much more than only adapt to that development. They have to focus more on

- **developing products for the society of tomorrow,**
- **identify potentials for new business models,**
- **create the conditions for an open and transparent exchange with other companies,**
- **specifically develop future markets and**
- **become more attractive for employees by creating a sense of purpose.**

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federations and associations

can support companies in getting the needed information and networking offers. It is needed,

- **to analyse potentials of new markets as soon as possible,**
- **to strengthen interdisciplinary application research,**
- **to widen existing consultation and networking offers as well as to**
- **develop matchmaking platforms.**

Political deciders

have to be ready to create the required conditions for a sustainable and digital transformation of the textile value chain. It must include

- **long term effective and binding regulatory roadmaps,**
- **accelerated standardisation processes for innovative textile solutions,**
- **new funding mechanisms to strengthen the cooperation of small and medium sized** enterprises and start-ups as well as
- **the to strengthen transfer activities in research funding.**