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TOPIC 6. INNOVATIONS IN THE TEXTILE AND CLOTHING INDUSTRY

The course is developed under Erasmus+ Program Key Action 2:
Cooperation for innovation and the exchange of good practices Knowledge Alliance

ICT IN TEXTILE AND CLOTHING HIGHER EDUCATION AND BUSINESS

Project Nr. 612248-EPP-1-2019-1-BG-EPPKA2-KA

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AGENDA

- **Innovations in Textile**
- **Innovations in Materials**
- **Innovations in Technics**
- **Assessment of Innovative Ideas**
- **Intellectual Property**
- **Insentives for TCI Innovations**

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Learning goals and objectives

In this topic the students will understand the importance of innovation for the development and growth of a business in the textile and clothing industry. They will learn the open innovation paradigm. They will learn how the innovations in the textile industry are classified. Different classifications are presented, as well as programmes for supporting innovations.

Short summary of content

Innovations in textile. Open innovation model. Innovations in materials, machinery and equipment. Assessment of innovative ideas. Programmes for TCI innovations.

Expected results

Students will be informed about the latest developments and innovations in the field of textiles, as well as the equipment, needed for production. They will be prepared to discover opportunities for continuous improvement of equipment and processes in order to increase the quality of manufactured products and to meet the high requirements of customers.

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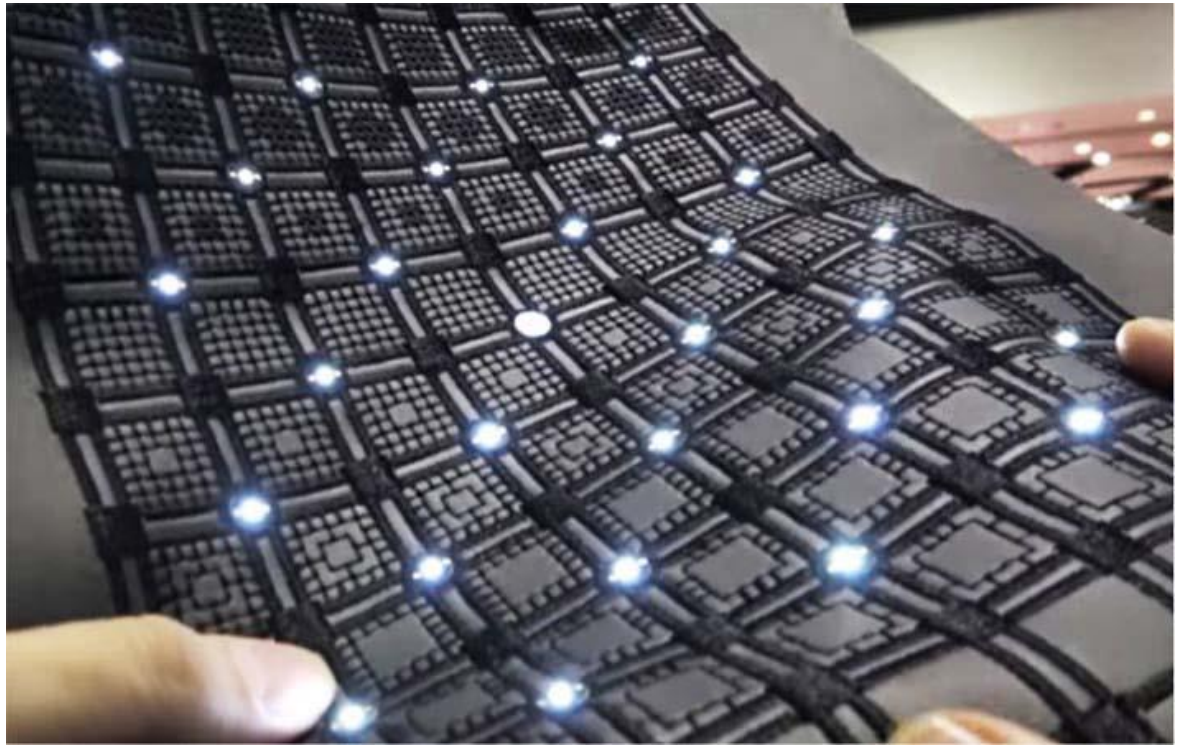
Innovations in T&C

Radical innovation is a fundamental breakthrough in science and/or technology, followed by a reduction to practice, followed by a practical and economical means to produce the innovations in products or services, followed by a widespread acceptance in the marketplace of the products or services.

Incremental innovation is the process of making minor improvements to existing products, services, processes or methods.



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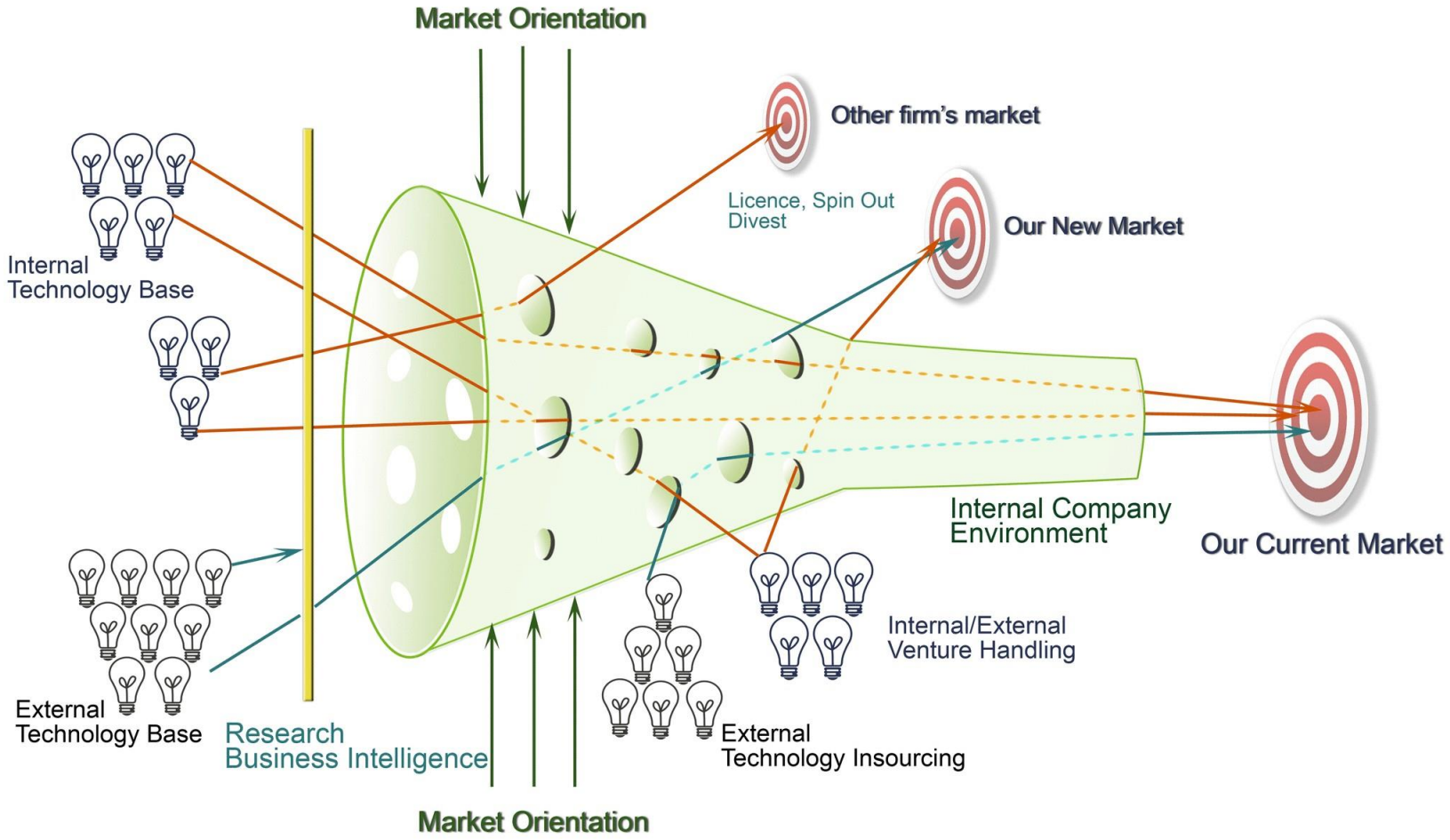
Open innovation funnel



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Source: Chesbrough (2003)

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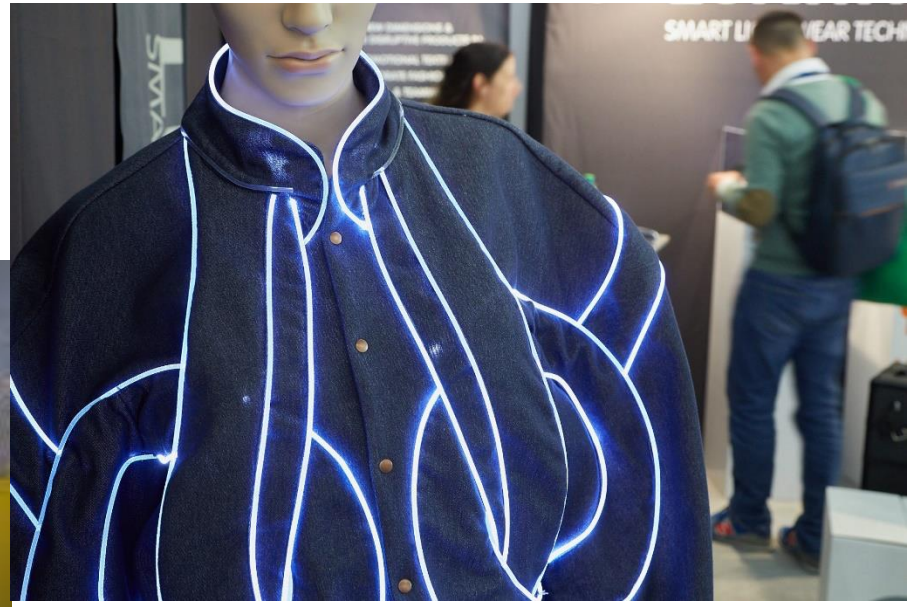
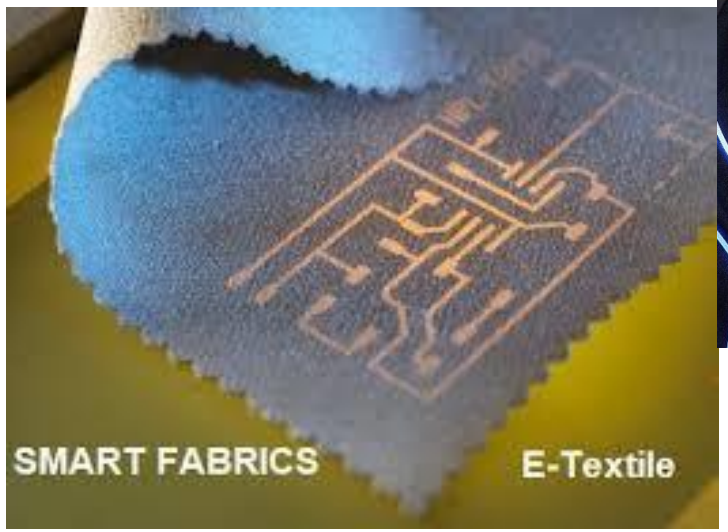
Innovations in textile

Innovation breakthrough:

How to find out the technological or materials breakthrough?

- Smart materials and products.
- Digital manufacturing.
- Bio-based materials.





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Example for innovation in textile

Researchers at Carnegie Mellon University and Rochester Institute of Technology have collaborated to develop a range of 3D objects which integrate simple embedded textiles. The new research indicates how advanced printings can be augmented with textiles to create functional prototypes.

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Source: www.tevonews.com

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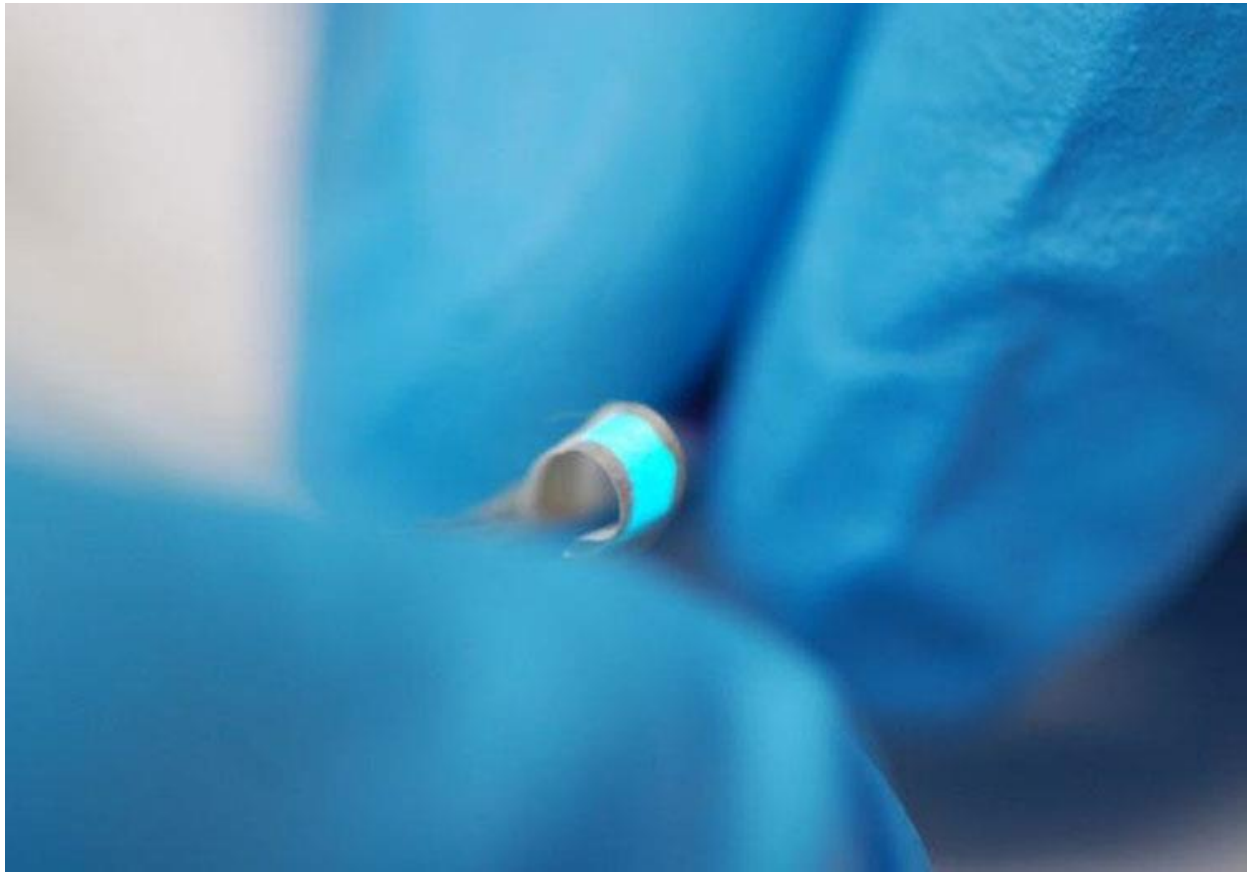
Example for innovation in textile

Scientists at the University of Exeter have developed a method of weaving graphene fibres within fabrics to provide power to smart clothing. The new research used polypropylene fibres to attach graphene-based electronic fibres to create touch-sensor and light emitting devices.



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Source: www.tevonews.com

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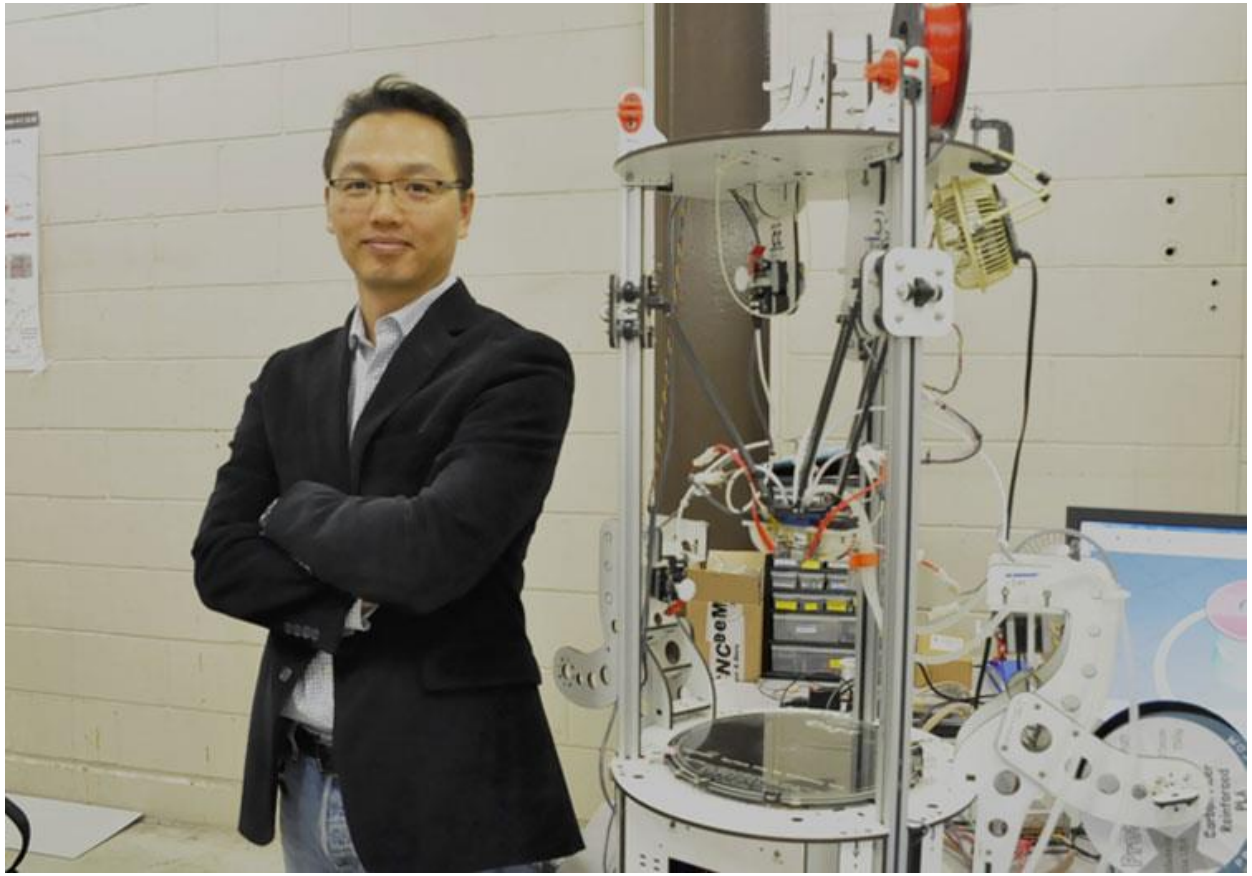
Example for innovation in textile

A research team at Simon Fraser University has developed a 3D printable solution for wireless sensors which involves the use of cellulose-based materials to replace plastic components in electronics.
The concept eliminates the waste from circuit boards used in textile technologies which are deemed a hazardous source of contamination to the environment.



Source: www.tevonews.com

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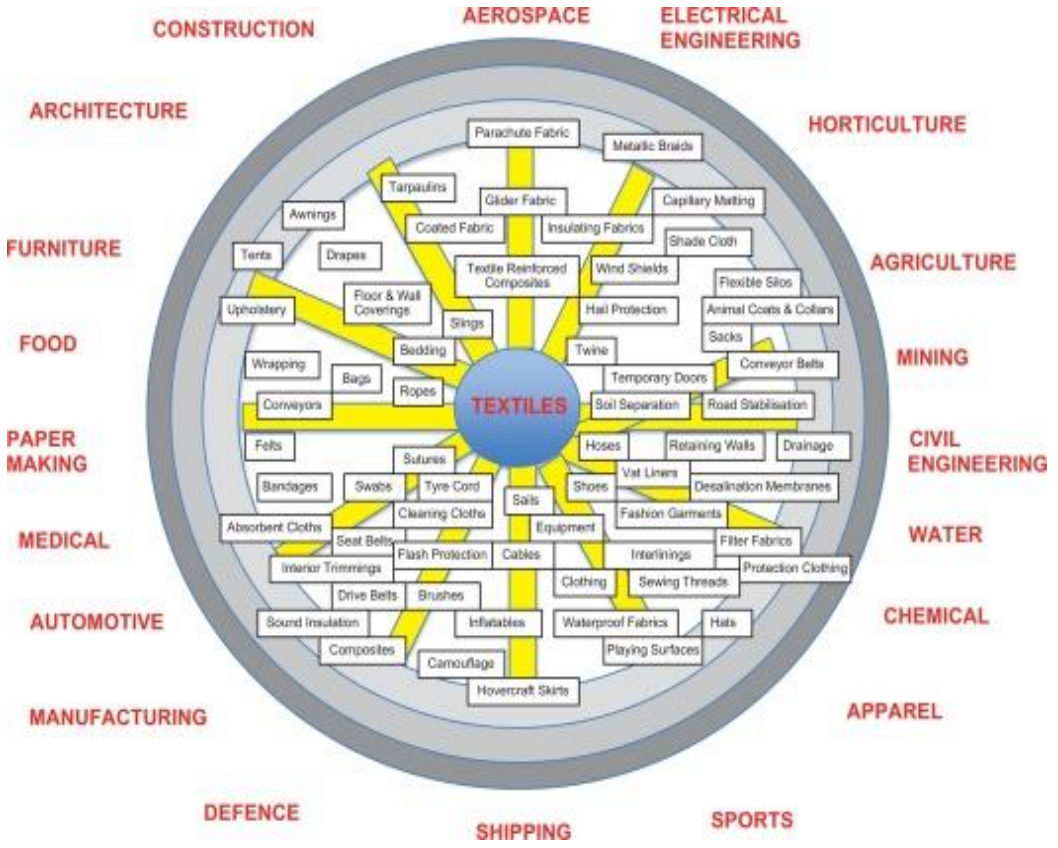
Innovations in materials. Journey of textile fibers

- **First-generation** of textile fibers: procured directly from the nature;
- **Second generation**: man-made fibers like nylon and polyester (1950-);
- **Third generation**: under-utilized natural resources.



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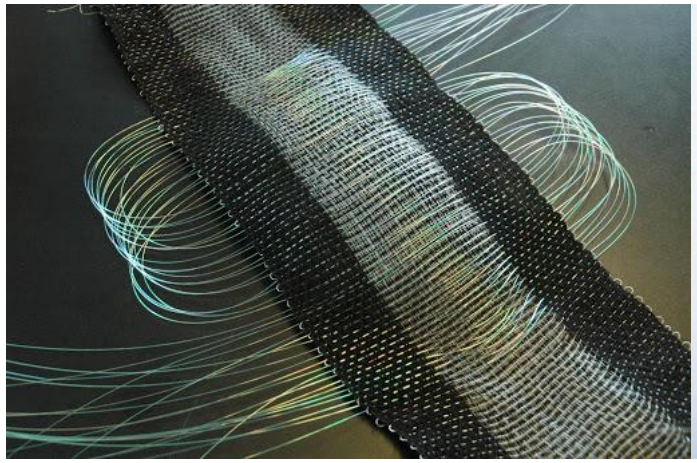
Innovations in materials and textile

- **Technical textile** - flexible materials, extremely light-weight structures, 3D moulding;
- **Smart textiles** - self-cleaning textiles, panel electroluminescence, chameleonic textiles, body monitoring garments;



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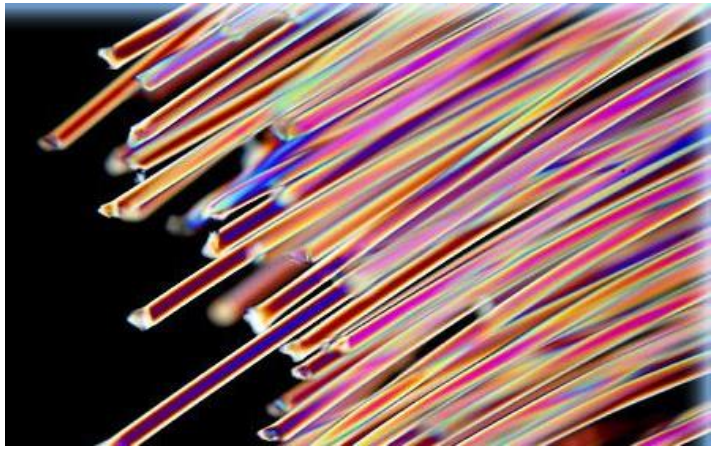
Innovations in materials. Innovative textile fibres

- **Geo-textiles -** used to cover the earth or floor;
- **Cool fabrics -** help in maintaining normal body temperature;
- **Biomimetics -** design of new fibre materials, systems or machines through the study of living systems, to learn from their high-level functional mechanisms and to apply those to molecular and material design;
- **Vivometrics -** The electronics integrated into textiles can read body conditions like heart beat, blood pressure, calories burnt, lap time, steps taken and oxygen levels;
- **Camouflage textiles -** The colour-changing surface of the chameleon is observed and recreated in the textile material;



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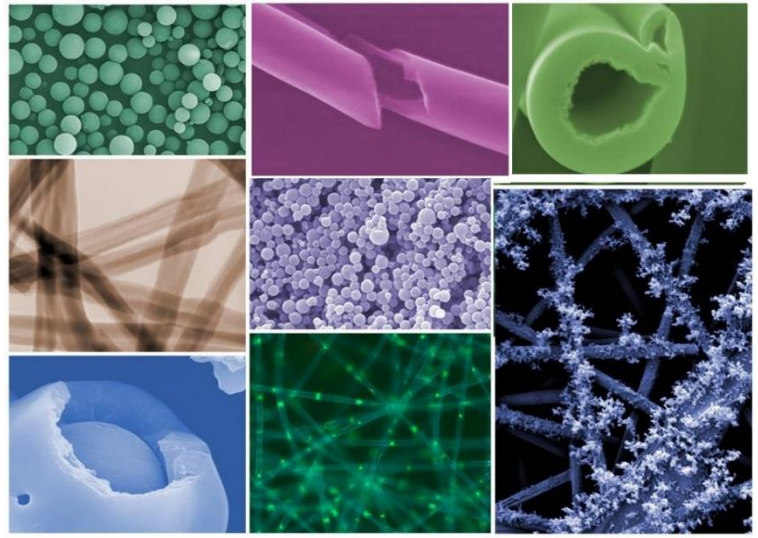
Innovations in materials

- **Textiles for drug delivery -** advancements in the health industry now combine textiles and medicine;
- **Microencapsulation -** simple process consisting of encapsulating liquid or solid substances in sealed micro spheres (0.5-2,000 microns);
- **Electronic textiles -** wearable electronics or built-in cell phone and MP3 players, run on batteries.



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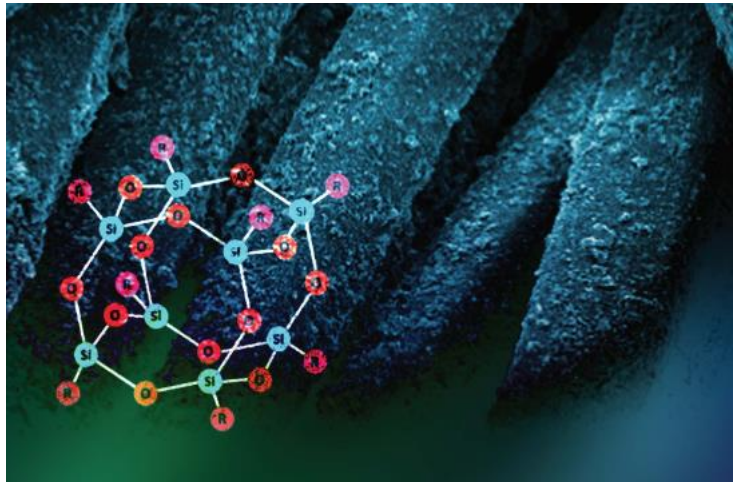
Example for innovations in materials

Smart or intelligent textile innovation was one of the most revolutionary development in textile innovation history. A new era due to the emergence of new materials as the building blocks of intelligent or smart textiles based on use of nano-technology and using textile innovations in the fashion industry will bring fashion businesses competitive advantage in 21st Century.
Less than 1% of material used to produce clothing is recycled into new clothing. This will be the next generation opportunity of development entrepreneurial business in TCI.



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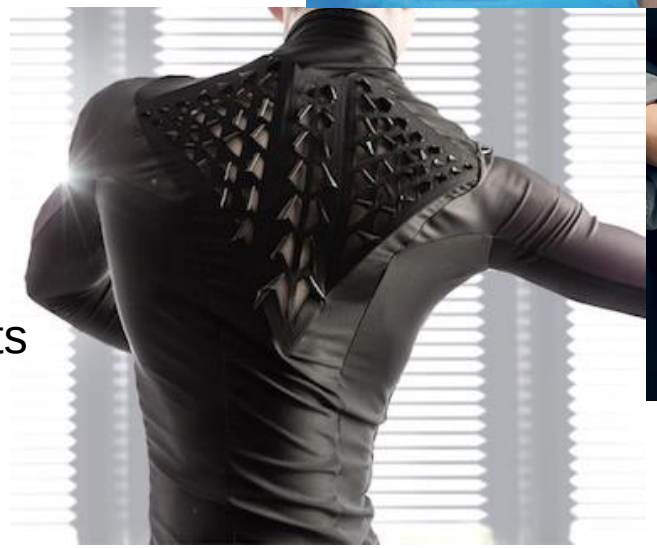
Assignment 1

How to find out the technological or materials breakthrough?

Give an example of a textile material innovation. Evaluate with stickie their estimation of the material breakthrough.

- Smart materials and products.
- Digital manufacturing.
- Bio-based materials.



Something new 

Already exists

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The role of technology in garment manufacturing

- Constant innovation and adoption of new technology becomes an essential element for competitive advantage in the global market because firms can maintain quick and flexible responses to market demand using the technologies
- While developing countries have disadvantages in developing and exporting advanced technologies due to capital intensiveness, they may adopt or borrow technology already in use within the industry that can increase their manufacturing industries' performances.
- Apparel executives believe that industry competitiveness depends upon the ability to quickly respond to demand with a variety of practices and better engineering practices. In this environment, technology to support such needs emerged as an important source of competitiveness.

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Needs of technology transfer in the TCI

- **Export orientation:** technology activities are an important factor in explaining the export performance of firms in developing countries.
- **Top Management Commitment:** top management commitment's to technology is likely to shape the firm's technology adoption activities/policies and influences its level of technology adoption.
- **Cost of capital:** Technology adoption highly depends upon the amount of planned capital expenditure and the firm's ability to secure capital for technology adoption.
- **Technical skills:** Many forms of technological implementation, especially adoptions of new manufacturing technologies, need to be accompanied by changes in skill requirements.
- **Competitive advantage:** The first and most obvious reason for adopting new technologies is to better satisfy the firm's needs and wants.

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Example for innovations in technics

For fibre manufacturing:

- Drawing part is incorporated into spinning machine or into false twisted machine;
- The speed of winder increase from 3000 m/min to 6500 m/min;
- The number of ends increase up to 24.

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Example for innovation in technics

Spun yarn manufacturing:

- New splicing technologies;
- Progress of ring spinning;
- MVS spinning.

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Example for innovations in technics

For woven manufacturing:

- Multiphase loom;
- Wave navigation systems;
- Flexible preparatory systems;
- Automated lines.

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Example for innovation in technics

Machines for knitting:

- Whole garment knitwear;
- Wrap knitted fabrics.

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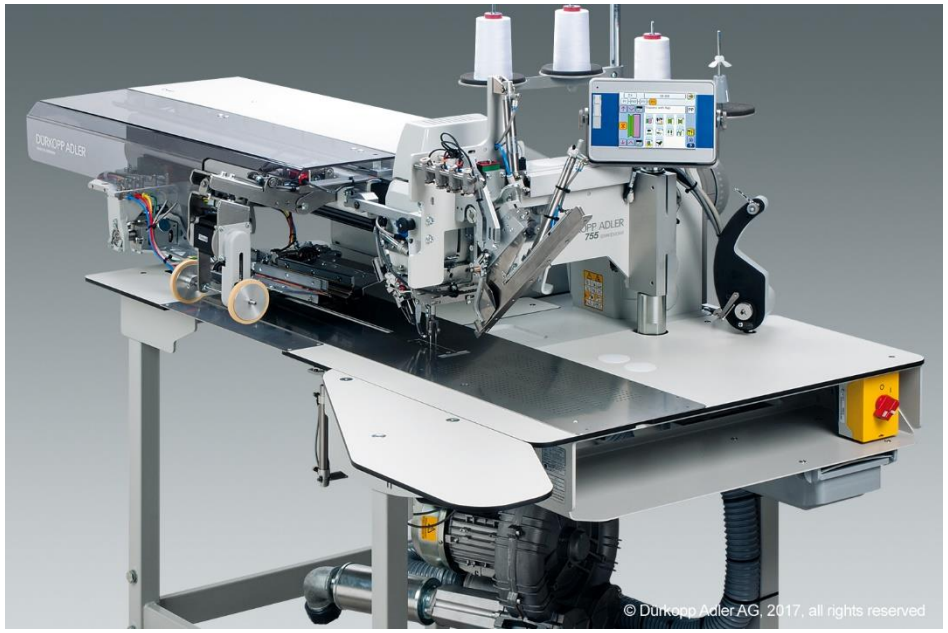
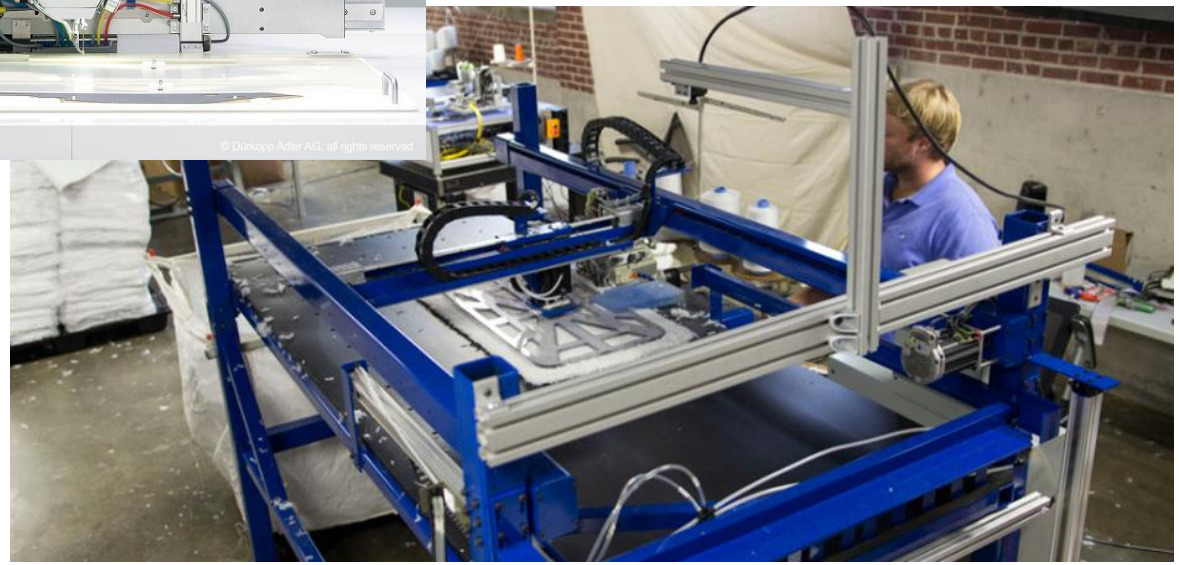
Examples for automatic-sewing-systems

https://www.assag.de/public/videos/ews7000.mov





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Assignment 2

Read the innovation profiles of the T&C companies: T&C Innovation Examples

Answer following questions:

- What are the competitive advantages there?
- What kinds of innovation drive them to success?
- Are these innovations applicable to your business idea?

Anti mosquito – protective fabric

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Assessment of innovative ideas

11 STEPS of innovative idea assessment

- Financial performance (FP), the achievement of the financial objectives outlined, including profitability, recovery period, sales, profits, global profitability and return on investment.
- Technical performance (TP), level of adequacy of the product.
- Customer performance (CP), degree of acceptance of the product by the consumer, satisfaction.
- Market performance (MP), as measured by national market share, foreign market share, revenue, the accuracy of market forecasts.
- Product performance (PP), the commercial result of a project of innovation, quality, competitive advantages and launch on time is evaluated.

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Assessment of innovative ideas

11 STEPS of innovative ideas' assessment

- Operational performance (OP), reflects how the innovation project was executed.
- Ece: Efficiency, evaluates the success of an innovation.
- Eca: Efficiency, evaluates the effort made to achieve that success.
- Sales performance (SP), consists of revenue, market share, and growth in sales against targets.
- Profitability (Pr), is measured by the level of benefits and profits against objectives.
- Window of opportunities (WO), in new product categories and new markets.

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Steps in programs and contests for TCI innovations

- Ideation startup.
- Proof of concept.
- Deployed solution which requires further scaling up.
- Showcase some measurable impact.
- Green technology used.

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Assignment 3

Give ideas and suggestions for an innovative product that replaces the plastic bag:

1. Single use plastic bag alternative;
2. Multi use plastic bag alternative.

Think of using natural textile, biodegradable, low cost, indigenous, environment friendly alternatives such as Jute, cotton, wool, silk for replacing single and multi use plastic bags.
Suggest cost effective product and materials, robust designs for different segments of customers.

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Assessment of innovative ideas. Metrics for innovation ideas

Qualitative metrics and provocative questions:

- Do we have a broad enough range of models of technology possibilities, tacit knowledge models, and societal trends?
- How good are we at creating an open sandbox that can accommodate a tremendous range of possible concepts and ideas?
- Are we encouraging people sufficiently to share their ideas?

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Assessment of innovative ideas. Metrics for innovation ideas

Quantitative innovation metrics:

- Number of ideas developed;
- Number of ideas contributed by our staff;
- Number of ideas introduced;
- Percent of ideas from outside;
- Number of people inside the organization who are participating in the ideation process;
- Number of people from outside the organization who are participating in the ideation process;
- Number of ideas collected in the ‘idea gathering’ system;
- Number of collected ideas that were developed further;
- Number of collected ideas that were implemented.

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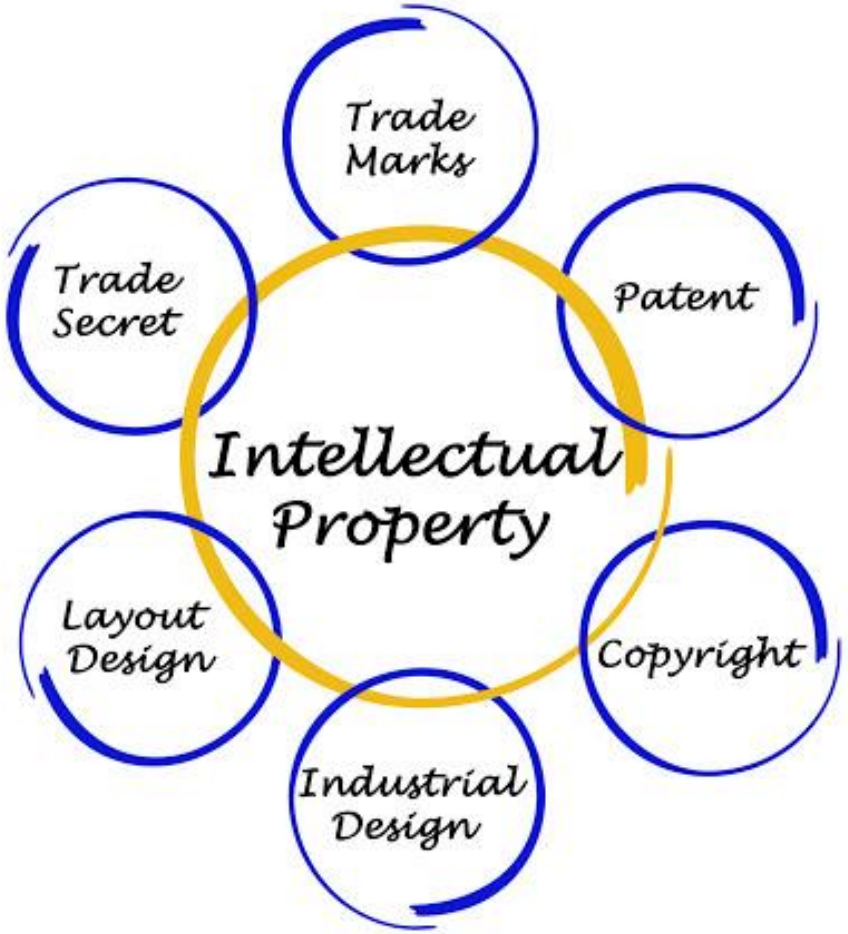
Intellectual property in the TCI



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Assignment 4

- How to identify innovation opportunities. Could you find the innovation window? Discuss on innovations opportunities on the next case:
  In 2009, Myung-won Seo from South Korea got the patent (US Patent No. 7488011) for Myung Jin S.M. Co. Ltd. for Button wrapping and knotting method and apparatus. The thread which is used for knotting is twisted for at least two times then passes over with the help of guides and winds around the sewing thread and forms firm knots. Patents in Garment Industry Technology in Button Wrapping

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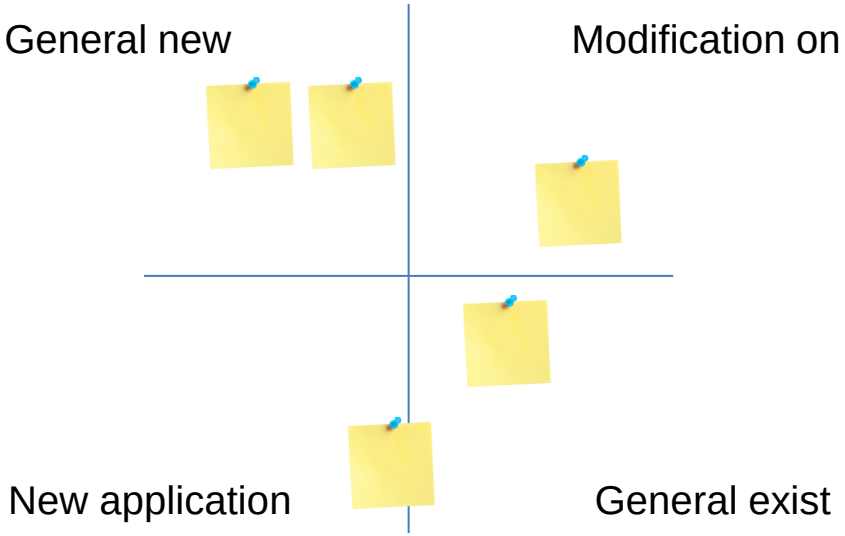
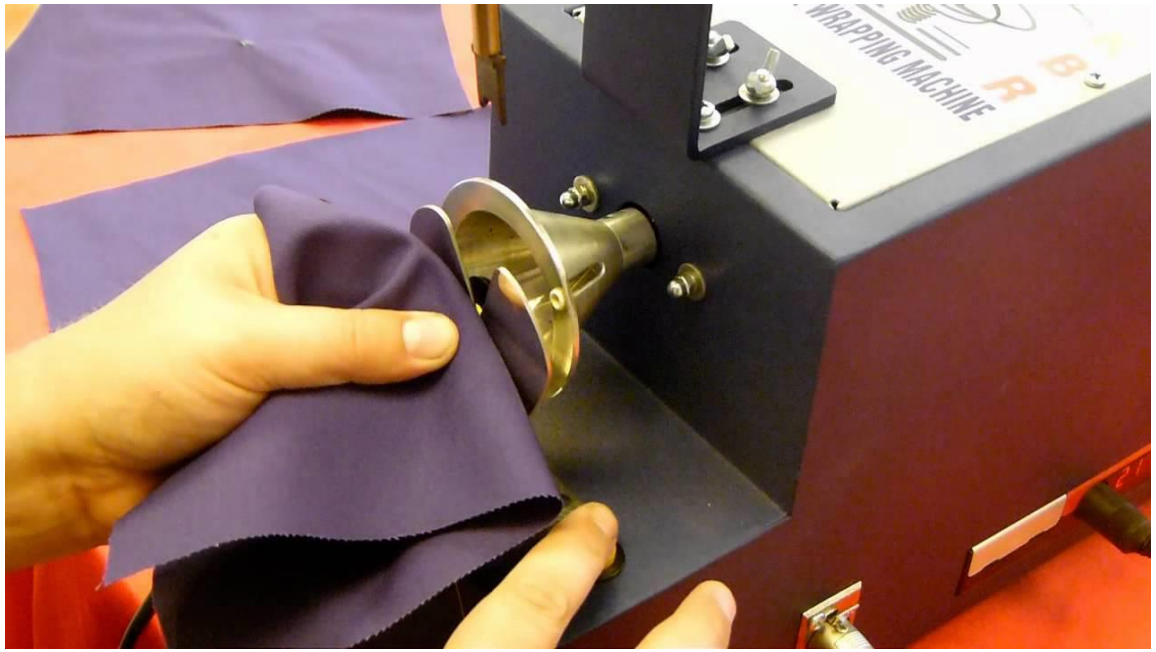
Assignment 4

- Could you find the innovation window? Discuss on the main innovations opportunities.





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Assignment 5

Read the article: Protecting Your Designs From Plagiarism In The Fashion Industry - Apparel Entrepreneurship. Do you think that for the realization of your T&C idea you have to register a patent or a trademark? Do you think that the topic - protecting of designs or ideas is important in the T&C business?

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Incentives for TCI innovations

European Commission and State government's incentives:

- Subsidized prices;
- Tax concessions;
- Reduced tariffs, e.g. electricity, water supply and etc;
- Grants, loans and subsidies.

Business backup incentives:

- Loan rates subsidies;
- Service, e.g. marketing, technical assessment, energy efficiency assessment and etc., state aids.

B2B incentives:

- Open innovation platforms;
- Innovation and entrepreneurial networks.

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Questions and tasks for discussion

- What classification of the textile materials do you know?
- What is the difference between open and closed innovations?
- Why does business economics depend on textile industry?
- What EU programmes for innovation do you know?
- Evaluate the innovativeness of your T&C business idea by comparing it with your competitors and by using an innovation checklist. For example: https://businessagility.institute/learn/nurturing-innovation/312.

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