Co-funded by the Erasmus+ Programme of the European Union

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

Co-funded by the Erasmus+ Programme of the European Union

ICT-TEX

СКИОТ SCIAT

AGENDA

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

Co-funded by the
Erasmus+ Programme
of the European Union

Learning goals and objectives

In this topic the staff trainees 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

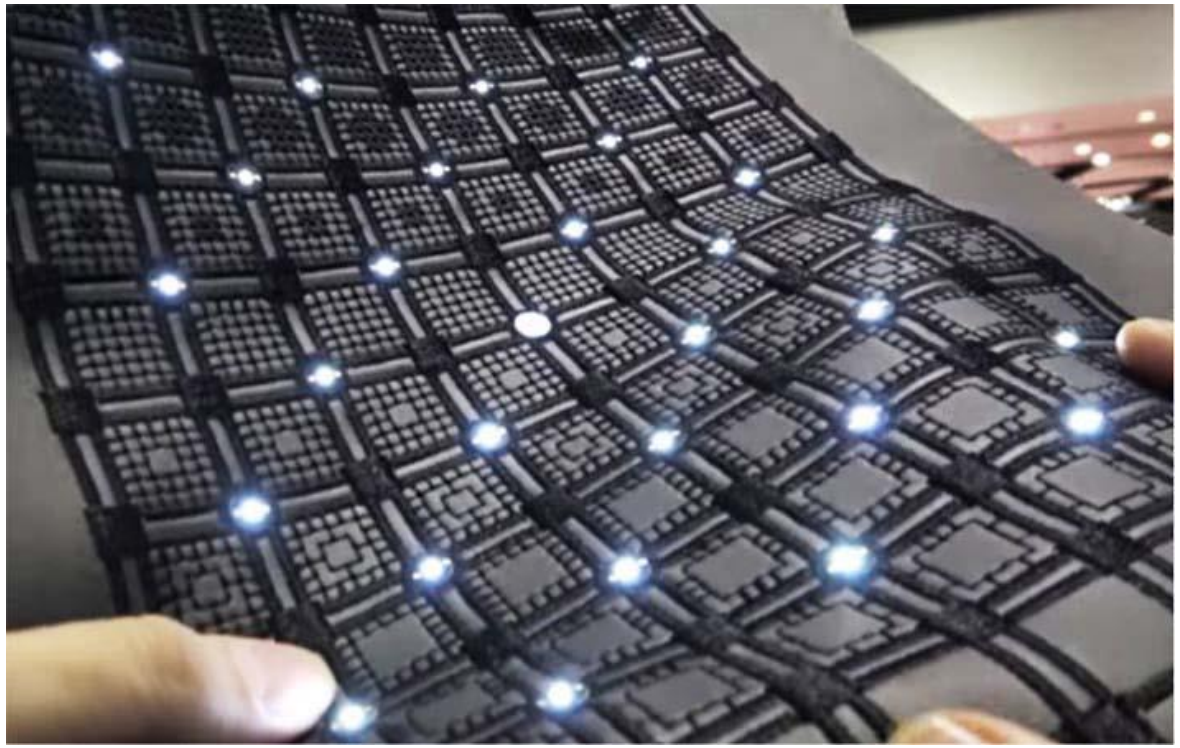
Staff trainees will be informed about the latest developments and innovations in the field of textiles, as well as the equipment, needed for production. They will be prepared to discover opportunities for continuous improvement of equipment and processes in order to increase the quality of manufactured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

Co-funded by the
Erasmus+ Programme
of the European Union

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.

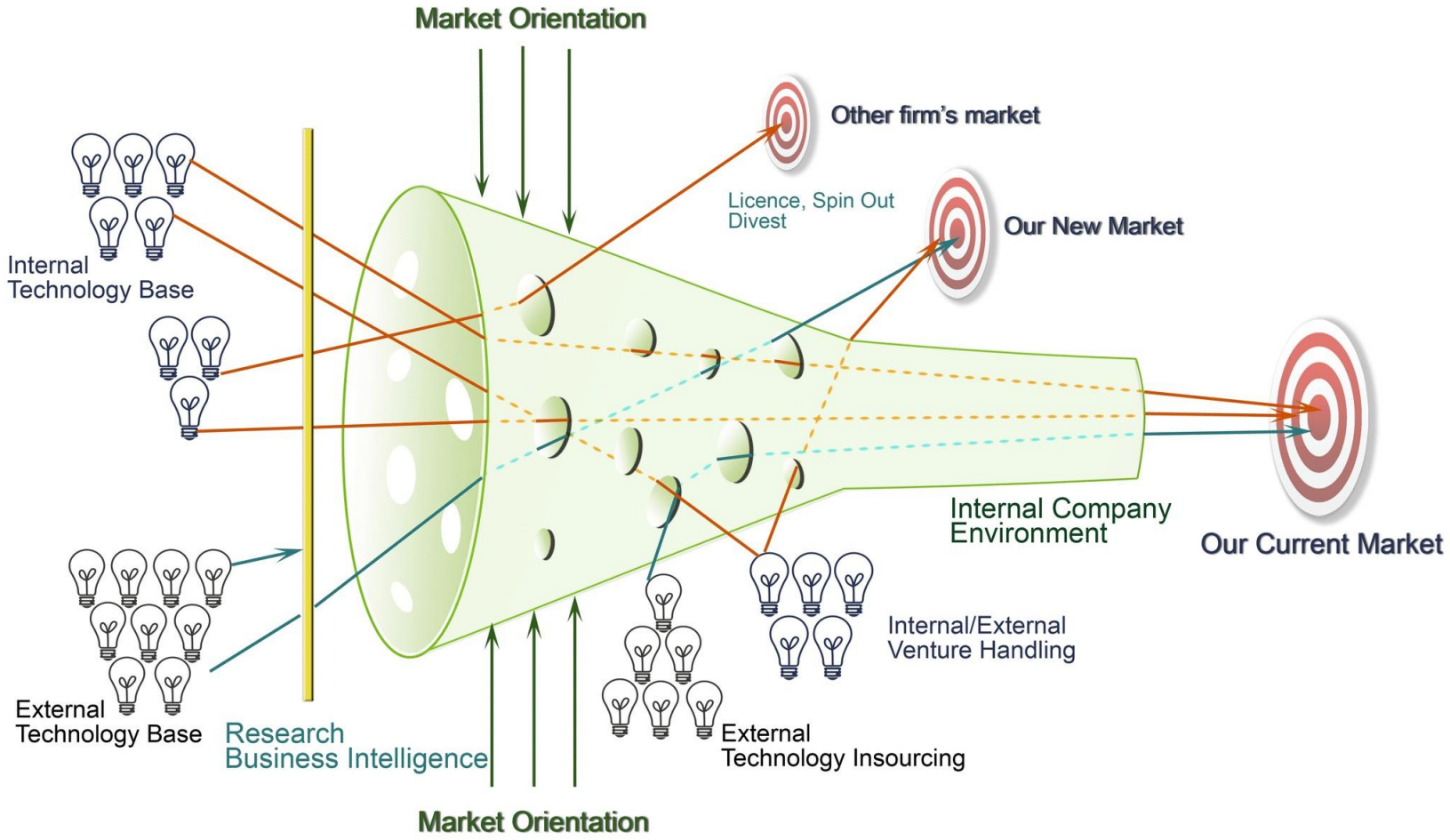
Incremental innovation is the process of making minor improvements to existing products, services, processes or methods.



top previous next bottom

Co-funded by the
Erasmus+ Programme
of the European Union

Open innovation funnel



top previous next bottom

Source: Chesbrough (2003)

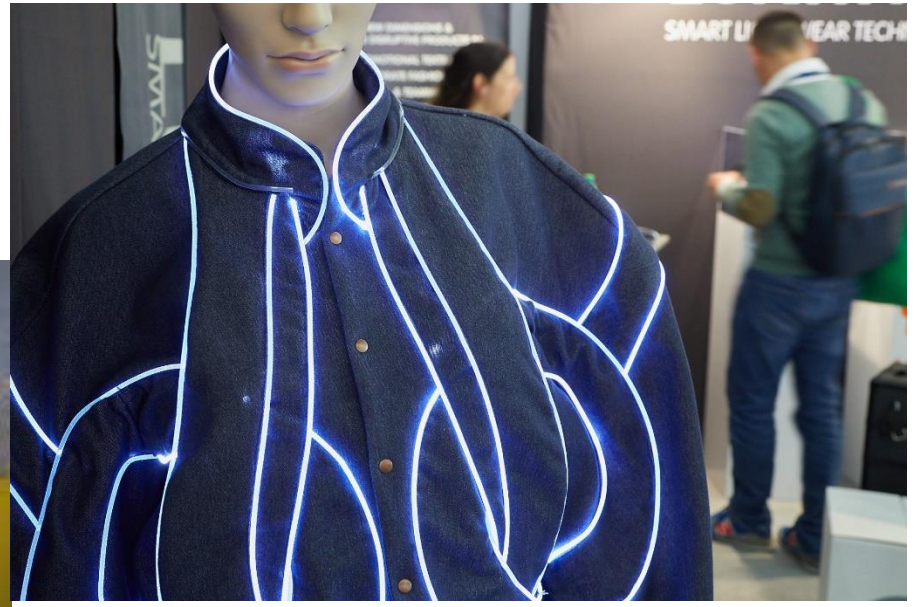
Co-funded by the
Erasmus+ Programme
of the European Union

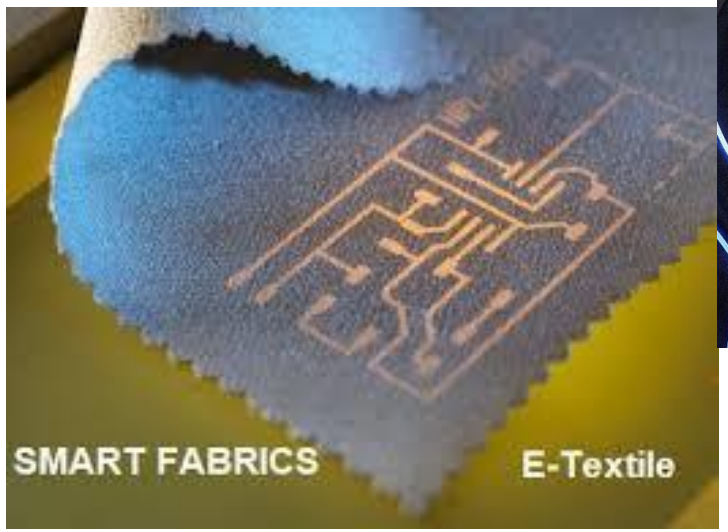
Innovations in textile

Innovation breakthrough:

How to find out the technological or materials breakthrough?

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

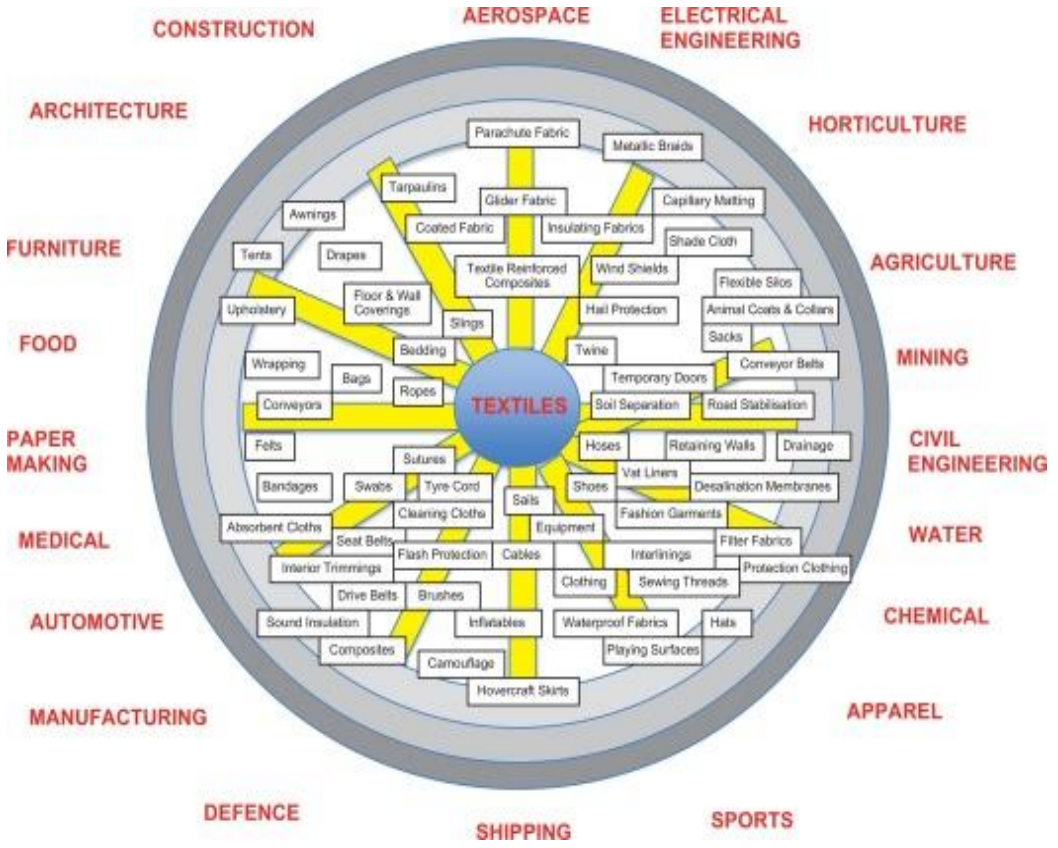




Co-funded by the
Erasmus+ Programme
of the European Union

Innovations in materials. Journey of textile fibers

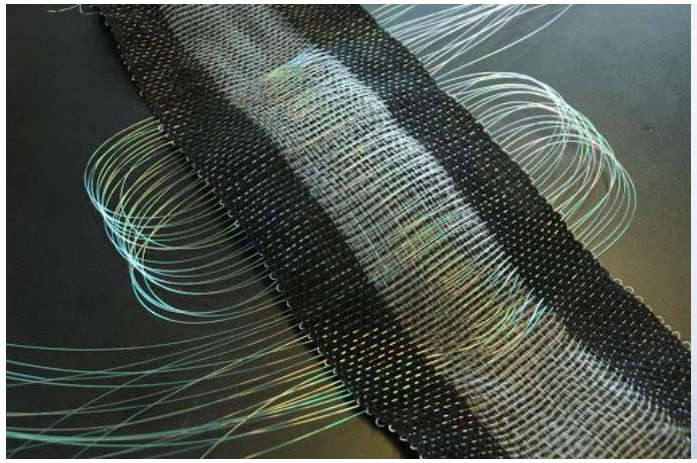
- **First-generation** of textile fibers: procured directly from the nature;
- **Second generation**: man-made fibers like nylon and polyester (1950-);
- **Third generation**: under-utilized natural resources.



Co-funded by the
Erasmus+ Programme
of the European Union

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;

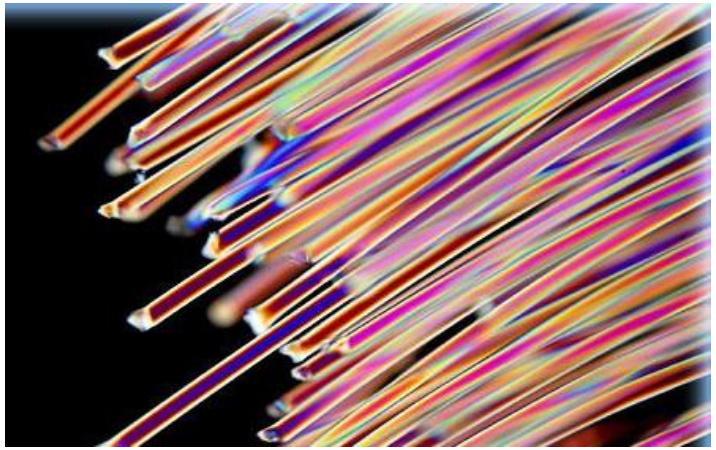


top previous next bottom

Co-funded by the
Erasmus+ Programme
of the European Union

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;



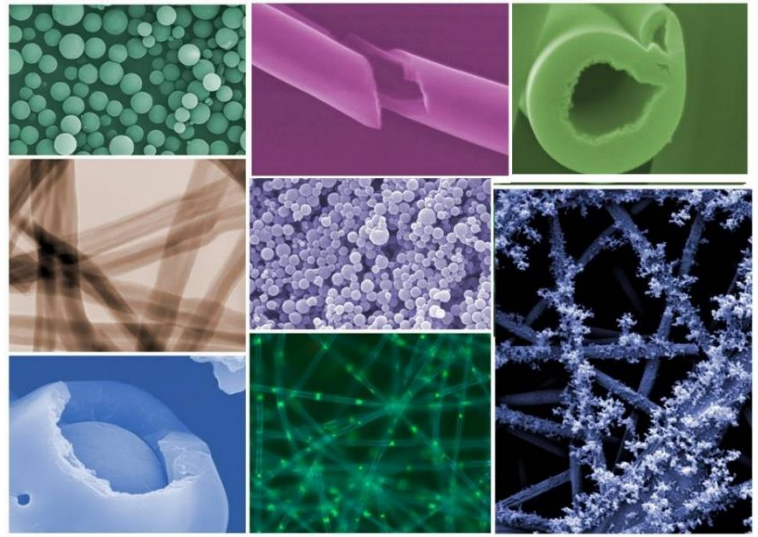
Co-funded by the
Erasmus+ Programme
of the European Union

ICT-TEX

СКИОТ SCIAT

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.



top previous next bottom

Co-funded by the
Erasmus+ Programme
of the European Union

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.

Co-funded by the
Erasmus+ Programme
of the European Union

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.

top previous next bottom

Co-funded by the
Erasmus+ Programme
of the European Union

ICT-TEX

СКИОТ SCIAT

Example for innovation in technics

Spun yarn manufacturing:

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

Co-funded by the
Erasmus+ Programme
of the European Union

Example for innovations in technics

For woven manufacturing:

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

Co-funded by the
Erasmus+ Programme
of the European Union

ICT-TEX

СКИОТ SCIAT

Example for innovation in technics

Machines for knitting:

- Whole garment knitwear;
- Wrap knitted fabrics.

top previous next bottom

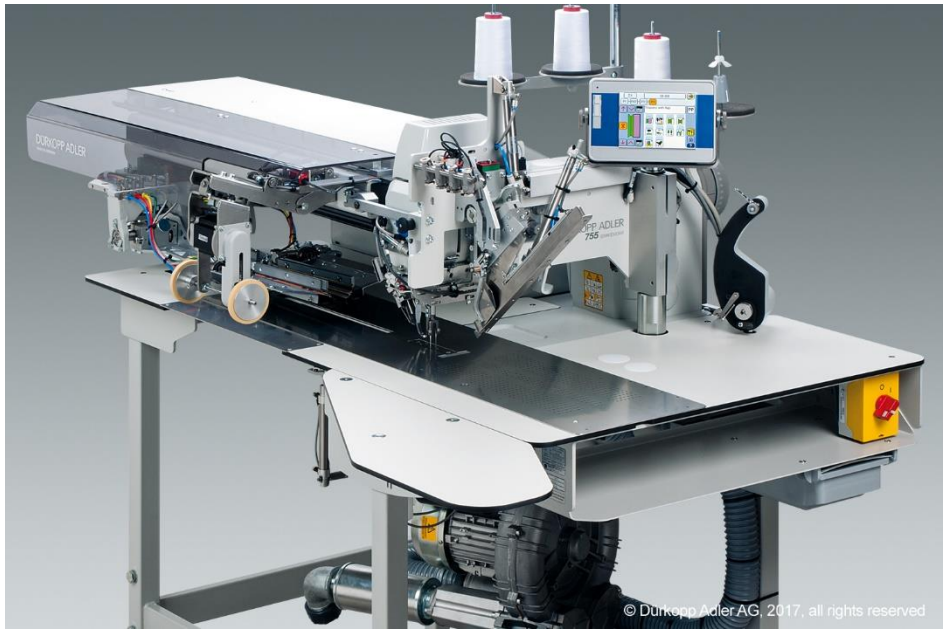
Co-funded by the
Erasmus+ Programme
of the European Union

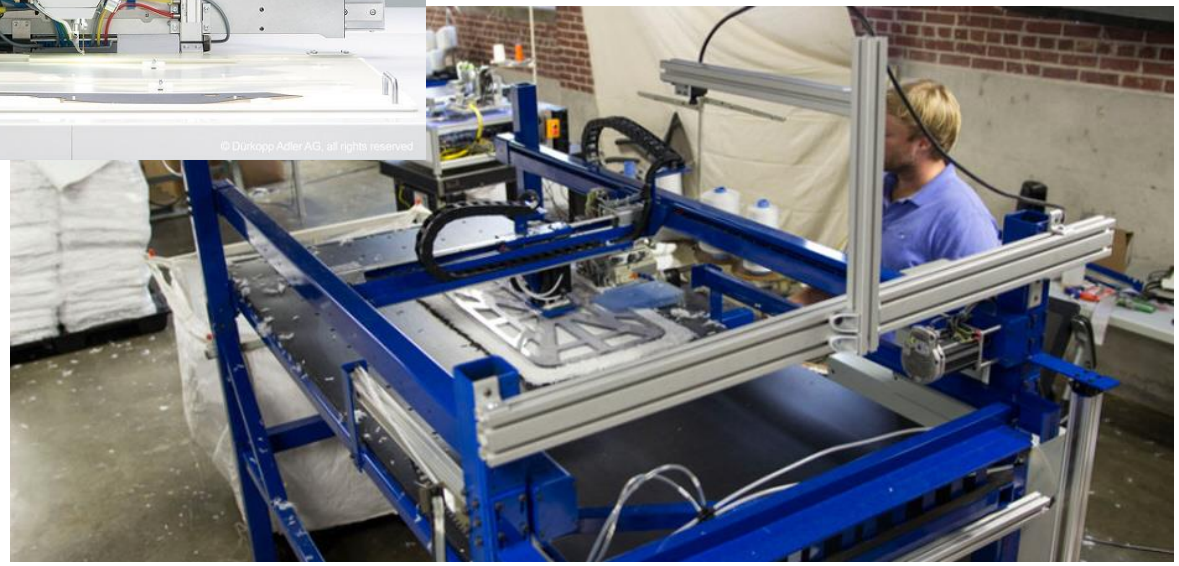
ICT-TEX

СКИОТ SCIAT

Examples for automatic-sewing-systems

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





Co-funded by the
Erasmus+ Programme
of the European Union

Assignment 1

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

Co-funded by the
Erasmus+ Programme
of the European Union

Assignment 2. Try to classify the innovations

Look at the next two examples and classify the types of innovations. Discuss on the type of given innovations using the model after the examples.

- Novozymes - a Danish biotech company specializing in enzymes and microorganisms, pioneered the use of enzymes in the treatment of fabrics. The company has developed and patented a technology for the treatment of “stone washed” denim jeans. This technology is based on an enzyme called cellulase, which removes some of the indigo dye from denim so as to give the fabric a worn look. Within three years, most of the denim finishing industry was using cellulase under license from Novozymes. Today, Novozymes’ technology for improving production methods and fabric finishing has been licensed worldwide. The company holds more than 4,200 active patents and patent applications, and pursues a pro-active licensing strategy to maximize royalty revenue from these IP assets.

Co-funded by the
Erasmus+ Programme
of the European Union

Assignment 2. Try to classify the innovations

- The Italian company Grindi Srl. invented Suberis, an innovative fabric made of cork, said to be as smooth as velvet, light as silk, washable, unscratchable, stain-resistant, waterproof and fireproof. After testing and codifying the treatment, Grindi filed an international patent application under the PCT in 1998 to protect its unique product in a large number of countries. The Suberis fabric is used in the manufacture of clothing, footwear and sportswear, as well as in many other application. [The story of Suberis International Ltd innovation]

Modification on

Something new

Already exists

Co-funded by the
Erasmus+ Programme
of the European Union

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.

Co-funded by the
Erasmus+ Programme
of the European Union

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.

Co-funded by the
Erasmus+ Programme
of the European Union

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.

top previous next bottom

Co-funded by the
Erasmus+ Programme
of the European Union

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.

Co-funded by the
Erasmus+ Programme
of the European Union

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?

Co-funded by the
Erasmus+ Programme
of the European Union

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.

Co-funded by the
Erasmus+ Programme
of the European Union

Assessment of innovative ideas. Metrics for innovation ideas

Resource view:

- Inputs: Capital, Talent, Time Percentage of capital that is invested in innovation activities such as submitting and reviewing ideas for new products and services and developing ideas through an innovation pipeline Number of entrepreneurs in the company, i.e. individuals who have previously started a business, either within the company or before joining the company Percentage of workforce time that is currently dedicated to innovation projects.
- Output: Return on investment Number of new products, services, and businesses launched in the past year Percentage of revenue from products or services introduced in the past three years Share of wealth, i.e., the change in the company's market value during the past year divided by the change in the total industry's market value during the same period.

Co-funded by the
Erasmus+ Programme
of the European Union

Assessment of innovative ideas. Metrics for innovation ideas

Capability view:

- Inputs: Preconditions Percentage of employees for whom innovation is a key performance goal Percentage of employees who have received training in innovation—for example, instruction in estimating market potential of an idea Number of innovation tools and methodologies available to employees Capability View Resource View Preconditions Processes Renewal Resources ROI Leadership View.
- Output: Renewal Number of new competencies (i.e. distinctive skills and knowledge domains that spawn innovation) measured as a simple count among a threshold proportion of employees Number of strategic options (i.e. newly created opportunities to significantly advance an existing business) Number of new markets entered in past year.

Co-funded by the
Erasmus+ Programme
of the European Union

Assessment of innovative ideas. Metrics for innovation ideas

Processes:

- Number of ideas submitted by employees in the past three, six, and twelve months.
- Ratio of successful ideas to ideas submitted.
- Number of ongoing experiments and ventures.
- Average time from idea submission to commercial launch.

Co-funded by the
Erasmus+ Programme
of the European Union

Assignment 4

- Digital manufacturing technologies LuxHome is a small company producing premium-quality bed linens, curtains and other interior textiles made with traditional textile machinery (i.e. Jacquard weaving looms, rotary printing, embroidery etc). The company is family run and has been operating for around 40 years with a team of 5 designers/product developers and 50 production workers who help design and produce the products. The company has been selling its products to luxury and design hotels mainly in its home market Italy but increasingly to other customers around Europe and the world. Recently there has been an increasing demand for customised products with rapid seasonal design changes and you are faced with the need to integrate hotel logos, colours and other design elements 35 into the product quicker. You also see huge potential in developing products that are customised to specialised markets, such as elderly consumers- a market that is anticipated to grow in the coming decades (particularly given the advancements in the area of technical textiles applied to ageing healthcare issues).

Co-funded by the
Erasmus+ Programme
of the European Union

Assignment 4

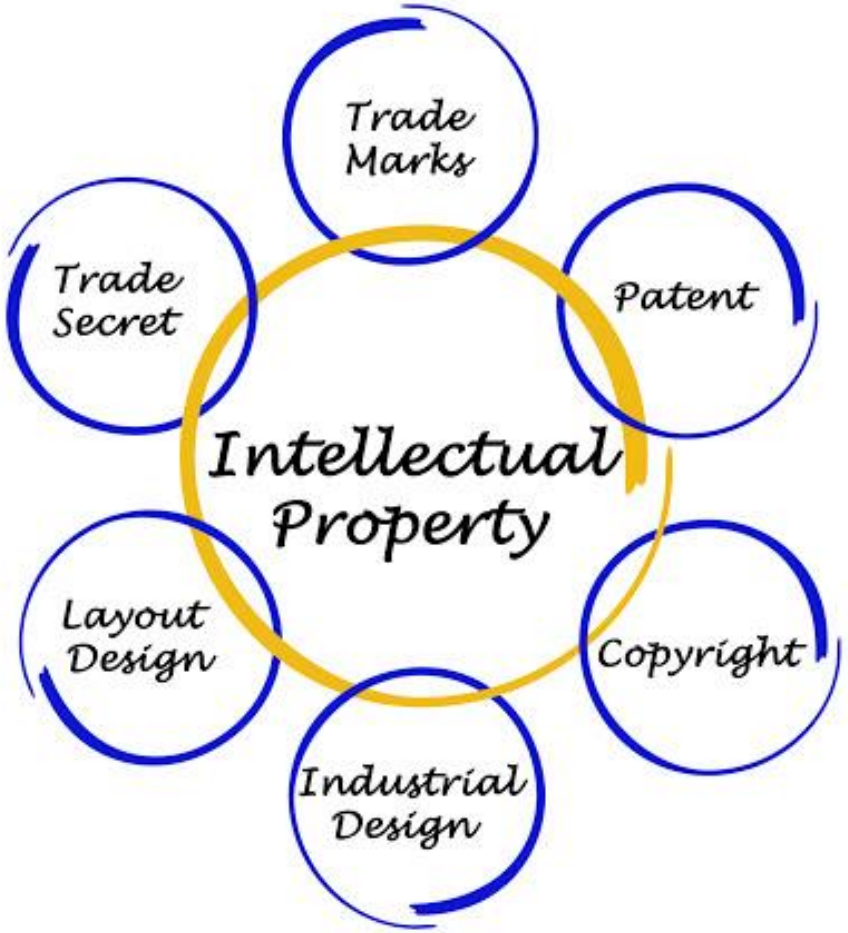
LuxHome's traditional textile machinery makes this small run rapidly changing productions highly inefficient and cumbersome. New digital manufacturing technologies such as digital printing or even additive manufacturing could be the solution, but the company lacks knowledge and operator experience with such machinery. Some new competitors start to offer such digitally customised home textiles and while the quality is not yet matching LuxHome's traditional fabrics it is improving rapidly. Therefore LuxHome has decided to modernise production processes and launch itself in the new era of digital textile manufacturing.

Questions:

- What is needed to make this possible?
- What would be the main challenges and how to overcome them?

Co-funded by the
Erasmus+ Programme
of the European Union

Intellectual property in the TCI



Co-funded by the
Erasmus+ Programme
of the European Union

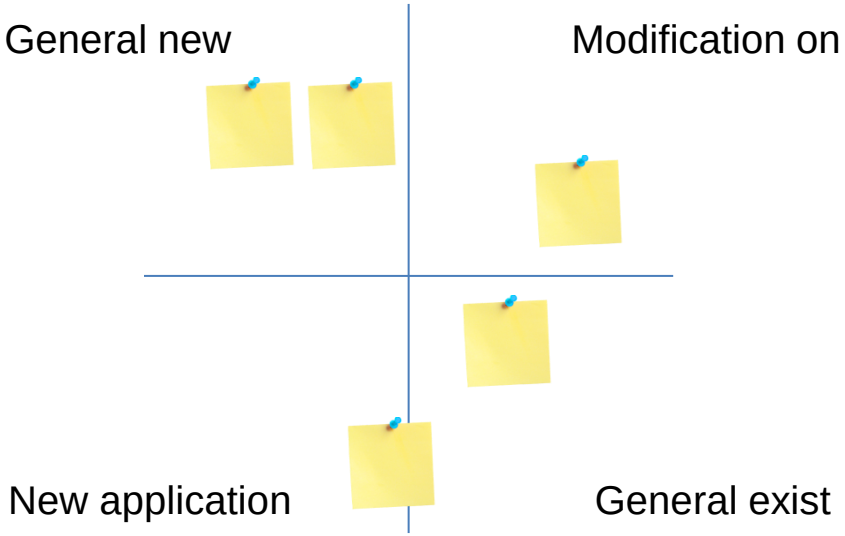
Assignment 5

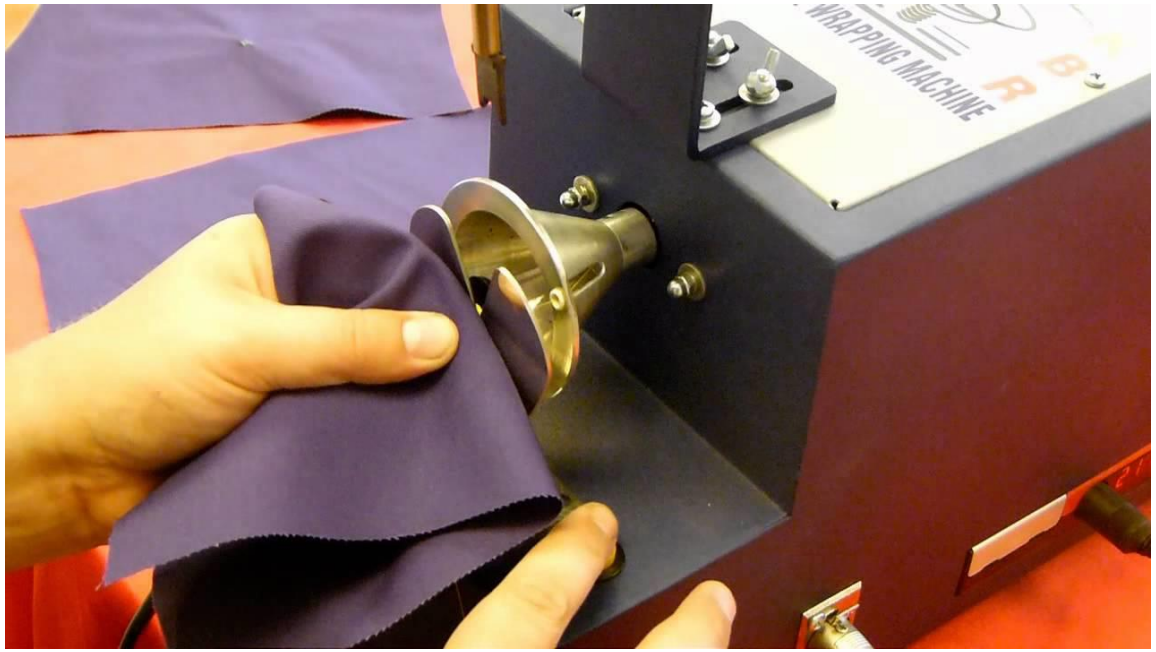
- How to identify innovation opportunities. Could you find the innovation window? Discuss on innovations opportunities on the next case:
  In 2009, Myung-won Seo from South Korea got the patent (US Patent No. 7488011) for Myung Jin S.M. Co. Ltd. for Button wrapping and knotting method and apparatus. 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

Co-funded by the
Erasmus+ Programme
of the European Union

Assignment 5

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





Co-funded by the
Erasmus+ Programme
of the European Union

Assignment 6

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?

top previous next bottom

Co-funded by the
Erasmus+ Programme
of the European Union

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.

Co-funded by the
Erasmus+ Programme
of the European Union

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.

CONTACTS

Coordinator:
Technical University of Sofia
Department of Textile Engineering

Project Manager of ICT-TEX:
assoc. prof. Angel Terziev, PhD
aterziev@tu-sofia.bg

Web-site: ICT-TEX.eu

Co-funded by the Erasmus+ Programme of the European Union

KNOWLEDGE ALLIANCE
ICT-TEX
ICT IN TEXTILE AND CLOTHING HIGHER EDUCATION AND BUSINESS