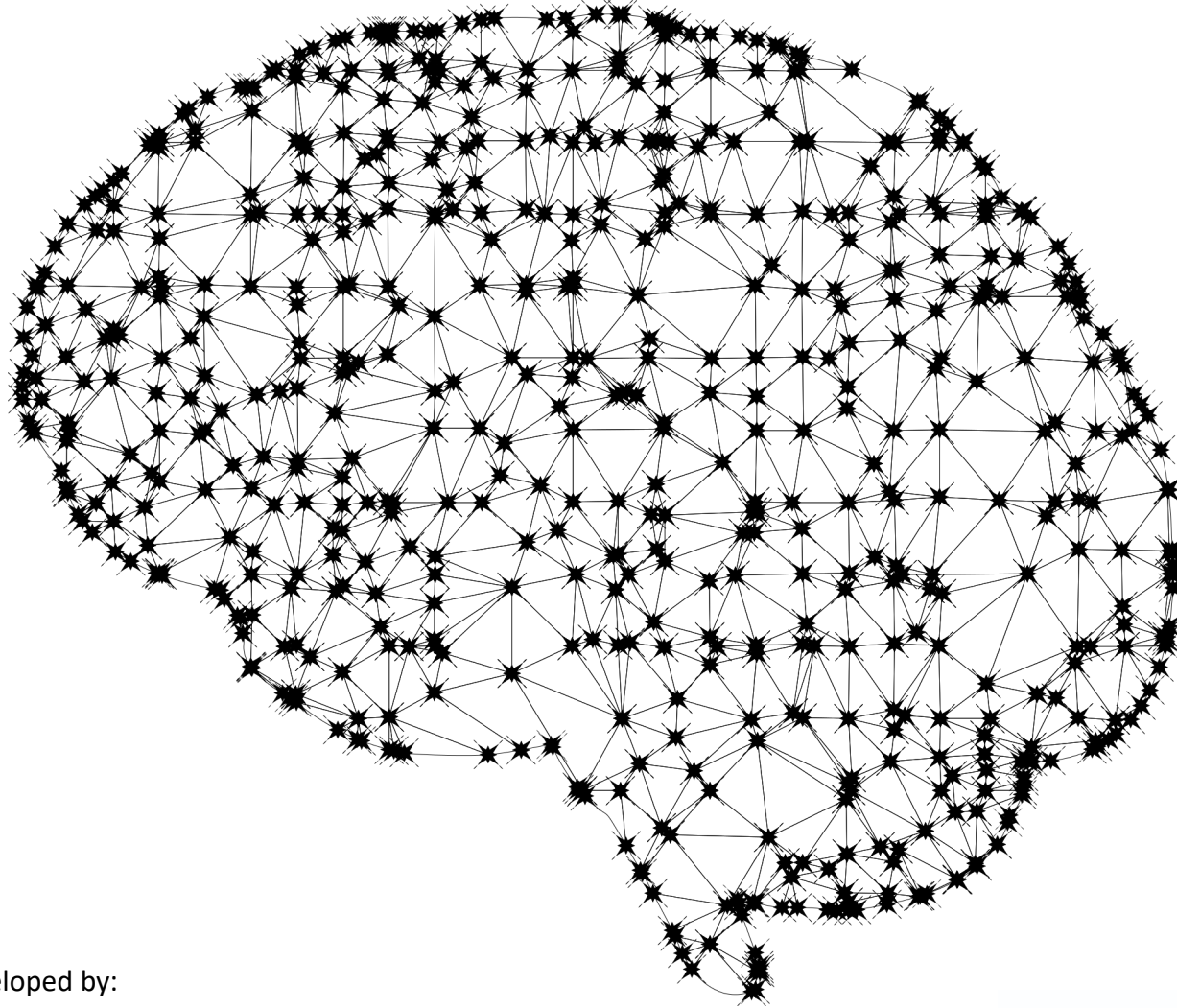


COMMUNICATION PLATFORMS & CUSTOMISATION



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Introduction



According to the European Textile Platform , “the future of European textiles and clothing sector will increasingly depend on the industry’s ability to relentlessly innovate in its products, to use the most advanced, flexible and resource-efficient processes and to focus its organizational structure and business operations on the constantly evolving needs of its customers”.¹ One of the pillars of development will be the move towards more customized, personalized and intelligent products, production, logistics and distribution. Current technology trends and developments are reshaping the operation of the textile/ fashion industry and key technologies aiming at increasing collaboration and customization options are between others, Virtual and Augmented Reality, 3D printing, Artificial Intelligence (AI), Internet of things (IoT), Blockchain, Mobile commerce and digital transformation, to name a few.

Keywords

Virtual reality, augmented reality, 3D, communication, blockchain, internet of things

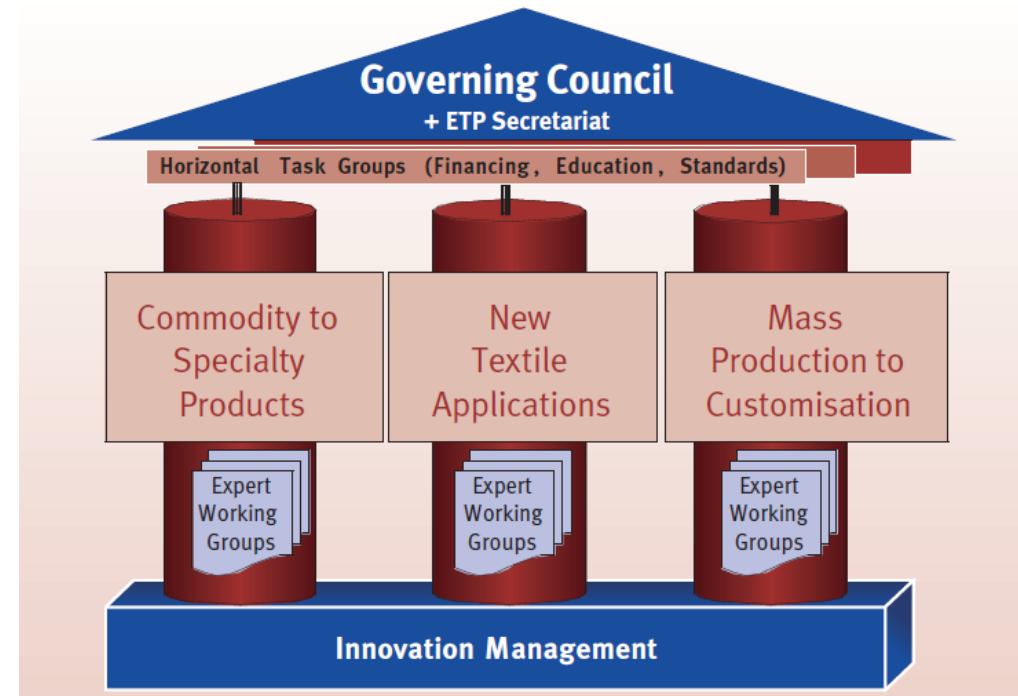


Image: European Technology Platform for the future of textiles and clothing
<https://www.certh.gr/dat/141D2148/file.pdf>.

1. Top 9 Technology Trends Reshaping The Fashion Industry In 2020, <https://techpacker.com/blog/design/top-7-fashion-technology-trends/>

Goals

Textile and fashion industry continuously evolve and concepts like the notion of 'seasons', mass manufacturing, mass distribution of goods, lack of new value system are some of the obstacles preventing traditional companies from evolving. Technologies that are currently used by high technology products are becoming more affordable and in the near future they will be used for consumer products, including the textile and fashion products. Smart connected products will require from the companies to build an entirely new technology infrastructure to support their operation. This technology enables not only rapid product development and operation but also the collection, analysis, and sharing of the potentially huge amounts of longitudinal data generated inside and outside the products that was not available before.²

To present some technologies that are shaping the future of the textile/ fashion companies and the way they affect the communication platform and the customization of the textile/ fashion products. It is not by any means an extensive and detailed presentation of the chosen technologies, but it will highlight the influence they will have on the sector. The list of technologies is not complete and such a task is beyond the scope of this presentation and of the project by itself.

The textile/ fashion industry as we know it today is over. In no way does it respond to the needs and values of consumers. A number of new technologies are here and all around us and they will fundamentally change the way that we communicate and develop new customized products.³

2. How Emerging Technologies will Affect Fashion Manufacturing, <https://fashnerd.com/2017/03/emerging-technologies-apparel-product-development/>
3. E. Papahristou, N. Bilalis, (2017), "The Interconnected Fashion Industry", AUTEX 2017, <https://iopscience.iop.org/article/10.1088/1757-899X/254/17/172020>

Learning outcomes

Students who will go through this content are expected to be acquainted on a number on current subjects as they are applied in textiles and the way they influence the design of the products

Knowledge

Get acquainted with

Artificial Intelligence

Internet of Things (IOT)

Virtual and Augmented Reality

3D Printing

Blockchain

Skills

Be able to access implementation levels and barrier to implementation of these technologies

Set direction of the implementation

Competencies

Contribute on strategic thinking

Set new directions for product development processes

Choose tools and technologies to integrate in various business processes

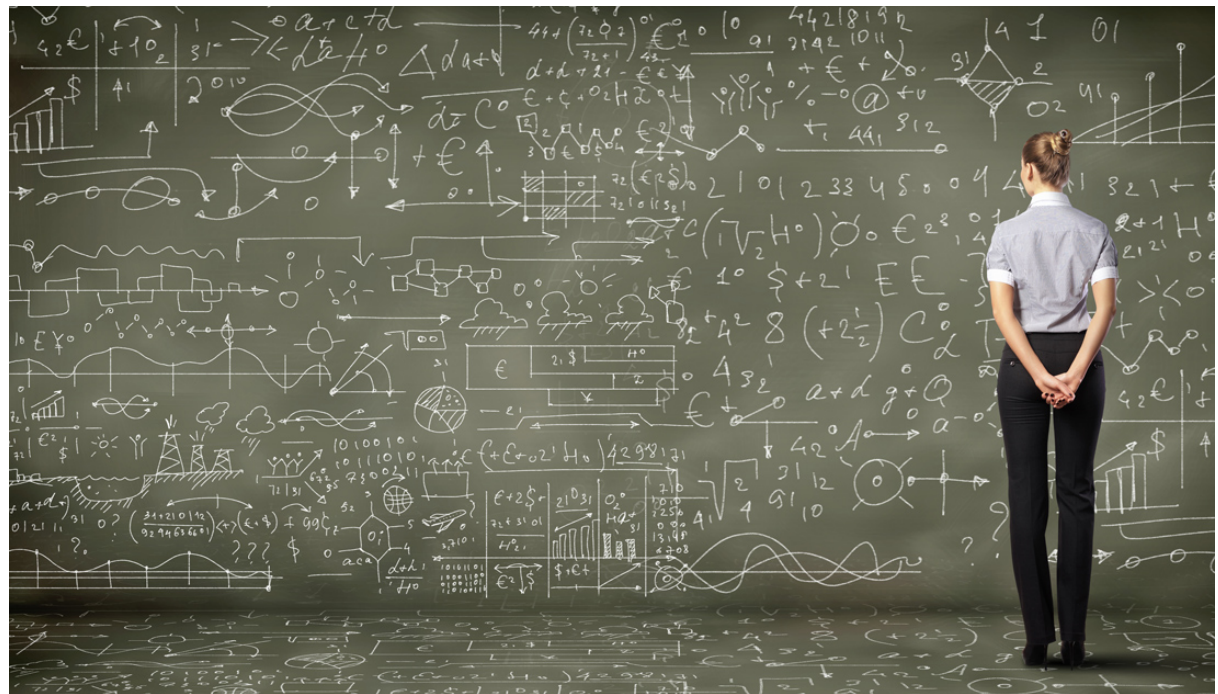


Image: <https://fashnerd.com/wp-content/uploads/2017/01/WomanChalkboard.jpg>

1. Artificial Intelligence

Currently, brands are experimenting with AI in nearly every activity they perform, such as enhancing customers' shopping experience, analyzing data, boosting sales, forecasting trends designing new products, enhancing collaboration and personalize customer preferences, among many other things. AI is reshaping business—though not at the blistering pace many assume.⁴

AI cannot be viewed as a plug-and-play technology with immediate returns. It requires investing in data infrastructure, AI software tools, data expertise, and model development. The return also is not immediate and it will take months or years without bringing the big wins executives expected. Most of the firms struggle to move from the pilots to companywide programs—and from a focus on discrete business problems, such as improved customer segmentation, to big business challenges, like optimizing the entire customer journey.

AI serves as a communication platform and it imposes interdisciplinary collaboration instead of siloed work. Cross-functional teams are formed with a mix of skills and perspectives. All operations require having business and operational people work side by side with analytics experts, ensuring that AI based initiatives address broad organizational priorities, not just isolated businesses.

AI is affecting also fashion creators, in order to react quickly and efficiently to the constant change of consumer demands and desires. It is required from the creating team to explore a large amount of data analysis from trend forecasting, market competition, sales data, social media platforms, to fashion houses runway looks. The inspirations are diverse and can come from anywhere. The diversity of designs created as new products is not found in any other industry and is almost independent of the size of the business. AI can unlock inherent data value through industrial data platforms and bring significant returns on investment in textile/ clothing manufacturers in terms of flexibility, efficiency, and time to market.⁵

4. Building the AI-Powered Organization, <https://hbr.org/2019/07/building-the-ai-powered-organization>

5. Papahristou, Chrysopoulos, The Integration of Technologies to Design & Implement an Intelligent and Semi-Autonomous Design Decision Making Workflow, PI Apparel Europe 2020, https://events.pi.tv/2020/apparel_eu/age

2. Internet Of Things (IoT)

The term IoT was coined by Kevin Ashton and it is a technical revolution that is bringing us into a new ubiquitous connectivity, computing and communication era. Several definitions for IoT exist, such as: IoT is defined as sensors and actuators connected by networks to computing systems, or IoT is a notion that depends on interconnected physical objects.

The benefits of IoT for apparel and accessories customers are huge, and currently most of them are linked to health. Smart sensors located in a shirt, for example, could track your heart-rate or temperature, while socks could measure your steps, calories consumed, amongst other data. This data will provide experts or doctors with valuable information that permits to monitor your health and performance.⁶



Image: [Link](#)

6. Internet of Things (IoT) in Fashion Retail, <https://fashionretail.blog/2018/06/11/internet-of-things-in-fashion/>.

The benefits of IoT for fashion retail companies are: to better understand customers needs and product usage, which will permit them to improve customer service; to optimize product assortment and customize recommendations; to improve design, pattern and shape; to have more insights to innovate; to track & trace thanks to RFID.⁷

Smart, connected products require that companies build an entirely new technology infrastructure. Embedded computing sensors will not only be found in clothes. Major applications of IoT in factories are, Operations optimization, Predictive maintenance, Inventory optimization, Health and safety. Manufacturing equipment capabilities go beyond the production of the physical product; for example, spreaders, cutters and sewing operations could all use IoT to communicate pertinent real-time information providing visibility across the entire product development process and supply chain.⁸

Customers of companies that operate IoT systems, ultimately will be the ones to capture the most value in the form of convenience, lower prices, higher quality, better features, improved service and more attractive customised promotions as IoT technology has the potential to drive down the costs of goods and services, as companies can gain a sharper picture of product use and accommodate much finer customer segmentation.⁹

7. Internet of Things (IoT) in Fashion Retail, <https://fashionretail.blog/2018/06/11/internet-of-things-in-fashion/>.

8. Tiago M. Fernández-Caramés and Paula Fraga-Lamas, Towards The Internet-of-Smart-Clothing: A Review on IoT Wearables and Garments for Creating Intelligent Connected E-Textiles, <file:///C:/Users/NIKOLA~1/AppData/Local/Temp/electronics-07-00405-1.pdf>

9. The State of Fashion 2020, Navigating uncertainty, <https://www.mckinsey.com/industries/retail/our-insights/the-state-of-fashion-2020-navigating-uncertainty#>

Companies can use IoT in novel ways to develop new business models or discover ways to monetize unique IoT data are likely to enjoy more sustainable benefits.

Applying IoT faces a number of impediments, such as energy source, education, data collection security and privacy, IPRs but above all there is the lack of understanding of the potential to use data, Technical challenges including finding efficient ways to transmit and store data and Analysing the data to derive actionable information.



Image: [link](#)

3. Virtual and Augmented Reality



Virtual and Augmented reality (VR and AR) allow combining the physical and online worlds. Today as many retail stores temporarily close due to the Covid-19 pandemic, VR-AR is the best tool for brands to represent themselves to mobile and online shoppers. AR is mainly based on smartphones to overlay digital content into the physical world, while VR requires more expensive and not usual equipment and it is not for massive use.

One common use of the technology is on virtual try-on. It allows customers to virtually try on outfits with high accuracy, especially when combined with customized body measurements. This type of online shopping usually engages and retains the customers longer as they get entertained seeing the product on themselves before buying; in a way, they play styling themselves. Using equipment like 'magic mirror' the customers live-cam-recording is overlaid with 3D-graphics which is the garment to be tried on. In VR the 3D model of the apparel product can be tried on the avatars body.

The technology allows customization, in terms of colour, patterns, markers, etc. and all this is in an interactive way through gesture recognition. Current trend is on the haptic representation of textiles in order to enhance realism.



Image: [link](#)

These technologies can also be applied in the design stage of the textile/ fashion products, resulting in less iteration loops, better process quality, enhance innovation, improved appreciation, etc. In addition, they compress the development time, as there is a fast realization and feedback, provision of complete data, better and accurate communication, parallel processing. Furthermore, they can slash textile waste as it is estimated that about £5-7 billion is spent on physical sampling in the apparel industry each year, used for generating 'mock-up' products, which are fitted and photographed and they often end up being burned or thrown in landfill.

However, their application is not totally straightforward, as it is on the early stages and there are not standard practices to address making every development a new project; this in turn has some implications, such as establishing new work processes, tasks, functions, responsibilities, etc.; it requires external advisors to be work in teams with company personnel having individual work and individual goals; the process must have the active support of the management.



Image: [link](#)

4. 3D Printing



3D Printing allows production of final products from a digital file. Originated for prototypes production and for electromechanical products, it is moving now to many diverse applications and sectors and not only for prototypes but also for final functional products. Today the term Additive manufacturing is used and it represents a whole range of technologies where the product is gradually printed in layers using a variety of materials.

3D printing is applied in many industrial sectors, but in the textile and fashion sector is still in its infancy. It is already applied in the footwear sector and there are already products from most of the athletic shoes producers. Brands like Nike and Adidas use this technology for producing effective shoe soles and padding. Fashion accessories, like jewelries, glasses, umbrellas etc. are easily produced by the 3D printing technology. 3D printing Technology had a wide presence in various industries like automobile parts, low-cost housing projects, medicine, engineering, science, etc for designing a blueprint and mass manufacturing. The fashion and textile industry is yet to completely implement the technology. The textile industry had fallen behind due to the fact that commercially available synthetic material for 3D printing like polylactic acid is not flexible enough to be used as Textiles or in a garment.¹⁰

10. 3D PRINTING – DISRUPTIVE TECHNOLOGY IN TEXTILE INDUSTRY, <https://textilevaluechain.in/2020/06/24/3d-printing-disruptive-technology-in-textile-industry/>.

Commercially available materials for most of the additive manufacturing processes are not yet flexible enough to be used as textiles. The whole textile industry, is awaiting the appearance of 3D printers capable of printing fabrics. Existing models seem to promise an imminent breakthrough. Just like we used to print regular documents on office printers, the designers will soon be able to produce a detailed sample model directly from a digital 3D model.

We are still at the conceptual stage with using this technology in fashion, but we can be optimistic that this technology can change the game for future retailers. Both in high-end and mass market fashion retail, 3D printing can eliminate the need for the extensive manufacturing process.¹¹



Image: [link](#)

There is a number of advantages when using 3D Printing for textile applications. It allows designers to unleash their imagination, as they can create novel structures, use new innovative materials and quickly produce the final sample; 3d Printed panels can be used with traditional textiles, such as cellulose fibers or polyester and they provide extra resistance or specific properties to the product; waste is eliminated, as 3D printing is using as much material is required for the product; many labor-intensive processes are eliminated resulting to reduced production cycle and labor cost; quality is predictive and repeatable.

However, there are many disadvantages that hinder their massive use. 3D printed textiles are in its infancy; 3D printed textiles and garments do not offer comfort, flexibility, drapeability and pleasure expected from these products; they cannot be combined with traditional garments and they require new and expensive techniques and they are also under research; the material cost is still high and it is for prototypes and not for high volume production.

Despite these obstacles there are many designers who have started experimenting with the technology.



Image: https://www.ispo.com/sites/default/files/styles/content_width_desktop/public/2019-11/DSC4405.jpg?itok=M8LzxaCn.



Image: https://media.bizj.us/view/img/10410668/adidas-carbon*1024xx1640-923-0-85.jpg

5. Blockchain



Blockchain originally created for cryptocurrency transactions, recording all transactional information. In general, a record of all transactions is kept securely, these are acquired through a distributed encrypted ledger or chain, stored on many computers in a peer-to-peer network. The larger the network, the more difficult to corrupt.

A physical-digital link between goods and their digital identities on a blockchain is created, making the supply chain more transparent. A digital history of information or an audit chain of the total value chain, with timestamps is created.

Blockchain technology can transform the supply chain of a textile/ apparel industry, and all process steps of product, including, supplier of cotton/wool, yarn producer, manufacturer, transportation and distribution, together with qualitative and quantitative information are gathered and accessed by all stakeholders.

Through blockchain manufacturers can promote a more ethical manufacturing process from the very beginning till the end of its life, providing sustainability and authenticity of the product and meeting challenges fraud, pollution, human rights abuses and other inefficiencies.

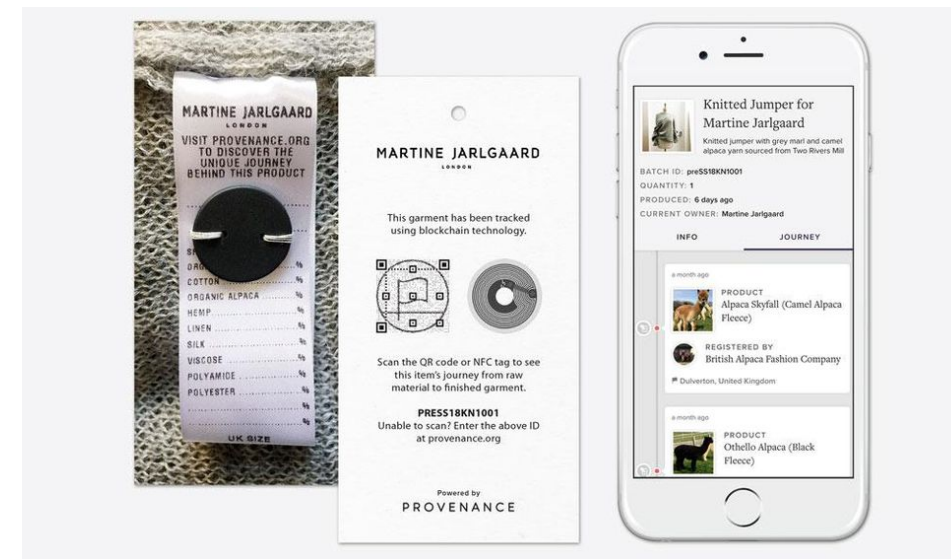


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Conclusions

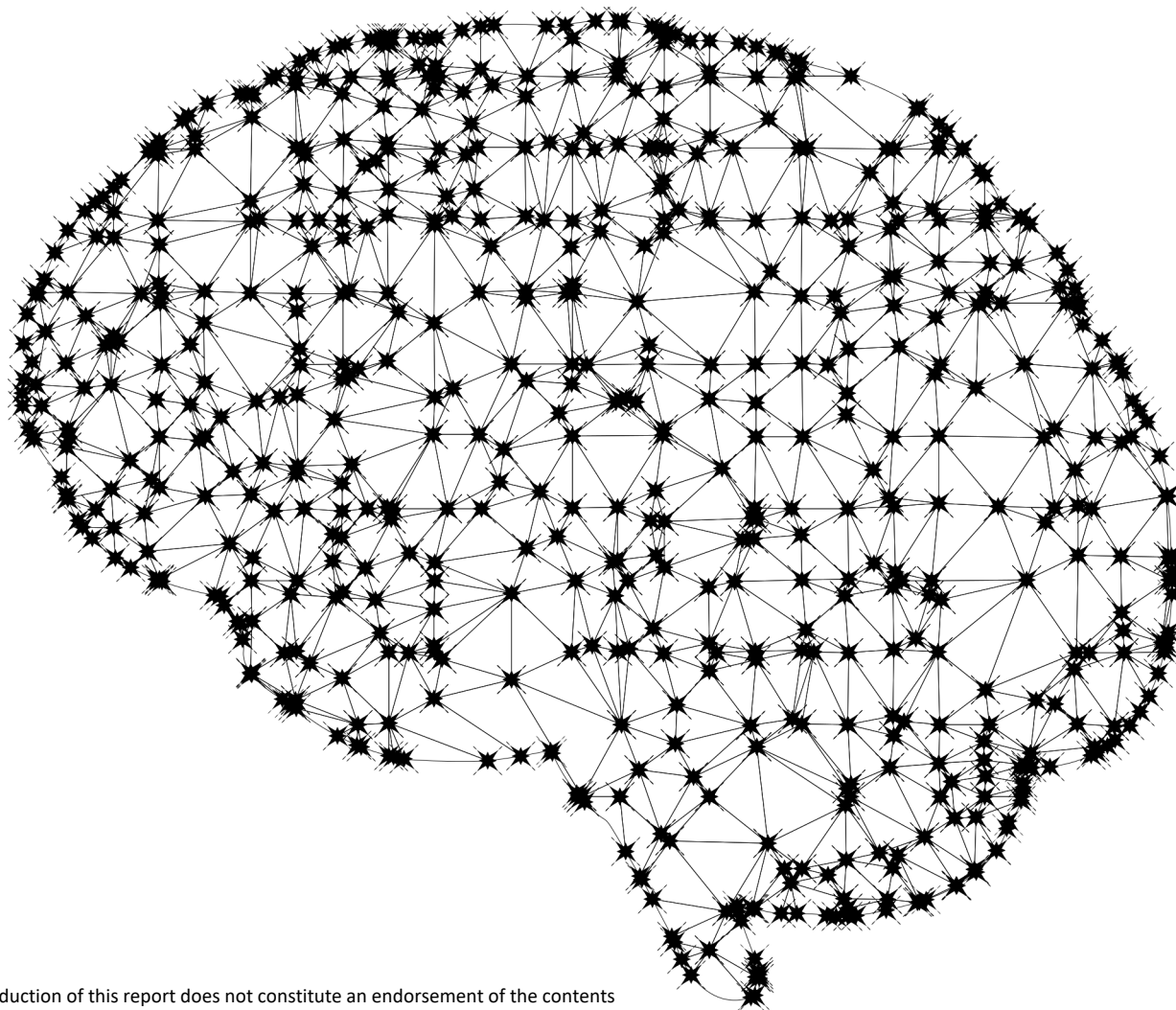
The textile/ fashion industry as we know it today is over. It is not only the working practices and the impact they had on their sustainability but also the current Covid-19 pandemic had a severe effect on the textile/ apparel and fashion industry and it will accelerate the use of some technologies that were in an experimental state so far. The industry is highly distributed and all products are developed in a collaborative way and this chain has been challenged many times and it was disrupted by the pandemic. The traditional working practices have been affected and new means, tools, methodologies and practices must be adopted.

In this presentation a number of new technologies that are here and all around us and they will fundamentally change the way we communicate and develop new customized products have been presented. The list of the technologies presented is not explicit and the description is not so detailed, but emphasis has been given on the advantages and disadvantages for their application and also on the procedure that must be taken in order to properly address their application.



Image: https://inteng-storage.s3.amazonaws.com/images/NOVEMBER/sizes/9_3D_printed_fashion24_md.jpg.

Visit <http://destexproject.eu/> to see the rest of the intellectual outputs of the project



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