

Interreg SUDOE

**SOE3/P2/E0866**

**DELIVERABLE E 1.1.1**

**GOOD DIGITALIZATION PRACTICES GUIDE**

**October 2020**



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## CAVEAT

*The content of this publication represents the author's own view and choice and is his sole responsibility; it can in no way be taken to reflect the views of the Executive Agency for Small and Medium Enterprises or any other EU organisation, who cannot be held responsible for the usage made of it.*

*All the information contained in this guide comes from the websites of the companies, from the online newspaper, from the online specialised press and from the knowledge of companies by authors.*

## INTRODUCTION: WHAT IS THE GUIDE AND WHOM IS IT FOR?

This guide, which has been developed within the framework of the Interreg Sudoe , axis n° 2 "SME competitiveness" project DigiTVC, has been designed as a practical tool for all the players in Textile-Clothing who are interested in digitalization projects.

It aims to facilitate the identification and characteristics of the good digitalization practices in the textile value chain.

Each good practice comes in the form of key information sheets relating to the practice such as the company involved, the main markets and the textile value chain, the good practice in context and its added value, the digital technology implemented and its impact on trade relations (If it's happened) and links to the internet source.

The guide is intended for a wide range of stakeholders, Textile-Clothing VSEs / SMEs, business support organisations and public authorities (at local, regional or national level).

## AUTOMATED WAREHOUSE PICKING AUTOMATED STORAGE AND RETRIEVAL SYSTEMS (AS/RS)

### 1. WHICH?

Companies: Grafer, Antecuir, Interfabrics, Textiles Pascual, Pascual and Bernabeu, Serpiscolor  
 Group: **Aquaclean Group**  
 Market: Designing and manufacturing fabrics for many different applications such as sofa upholstery, automotion or footwear  
 Country: Spain

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input checked="" type="checkbox"/> |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input type="checkbox"/>            |             |                          |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing / digital printing       | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input checked="" type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making / Cutting / Sewing                       | <input type="checkbox"/>            |
| - Knitting                    | <input checked="" type="checkbox"/> | - Clothing manufacturer                                   | <input type="checkbox"/>            |
| - Weaving                     | <input checked="" type="checkbox"/> | - Home textile producer                                   | <input checked="" type="checkbox"/> |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/> | - Quality control (fabric / garment inspection)           | <input type="checkbox"/>            |
| - Coating / laminating        | <input checked="" type="checkbox"/> | - Distribution  | <input checked="" type="checkbox"/> |
|                               |                                     | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

### Good practise: **automated warehouse picking**

Context: Aquaclean Group is a fully consolidated textile company group that produces many different fabric products every day. They must deal with challenges such as diverse inventory and lightning-fast picking goals. The automated warehouse picking is the implementation of robotic technologies that enhance the work of human pickers. The advantages of this system in front a traditional warehouse are the following:

- Automated products placement on the shelves by locations.
- Automated pick up according to the customer order.
- Elimination of the picking labor and reduces the risk of repetitive manual handling
- Improvement of the traceability and 100% order accuracy

## 3. WHAT?

The warehouse is used by all the group companies to keep the finished products.

With this system more product can be stored in a smaller amount of space. In fact, an AS/RS can store 40% more pallets in the same space as a conventional rack warehouse.

Only one worker is needed to operate to introduce and retrieve the product as it follows the idea of 'bringing the product to the worker' as opposed to the worker retrieving the product. This greatly decreases the amount of physical labor involved with these tasks, including walking, lifting and carrying heavy loads.

The system provides less shipping errors with just-in-time order fulfilment.

In addition, with the warehouse execution system the Group has total control over their inventory, whether it is a slow-moving seasonal product, or a product that is popular all year round. Therefore, without having to worry about inventory and maximizing space, manufacturers and distributors can focus on more critical areas, like fulfilling orders.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

This picking equipment, consists of a robot that travels horizontally in a corridor, guided by a lower and upper rail.

Technology: AS/RS Systems (Automated Storage & Retrieval Systems)

Suppliers:

<https://www.ulmahandling.com/en/automated-intralogistics/solution-automated-storage-systems>

<https://www.westfaliausa.com/>

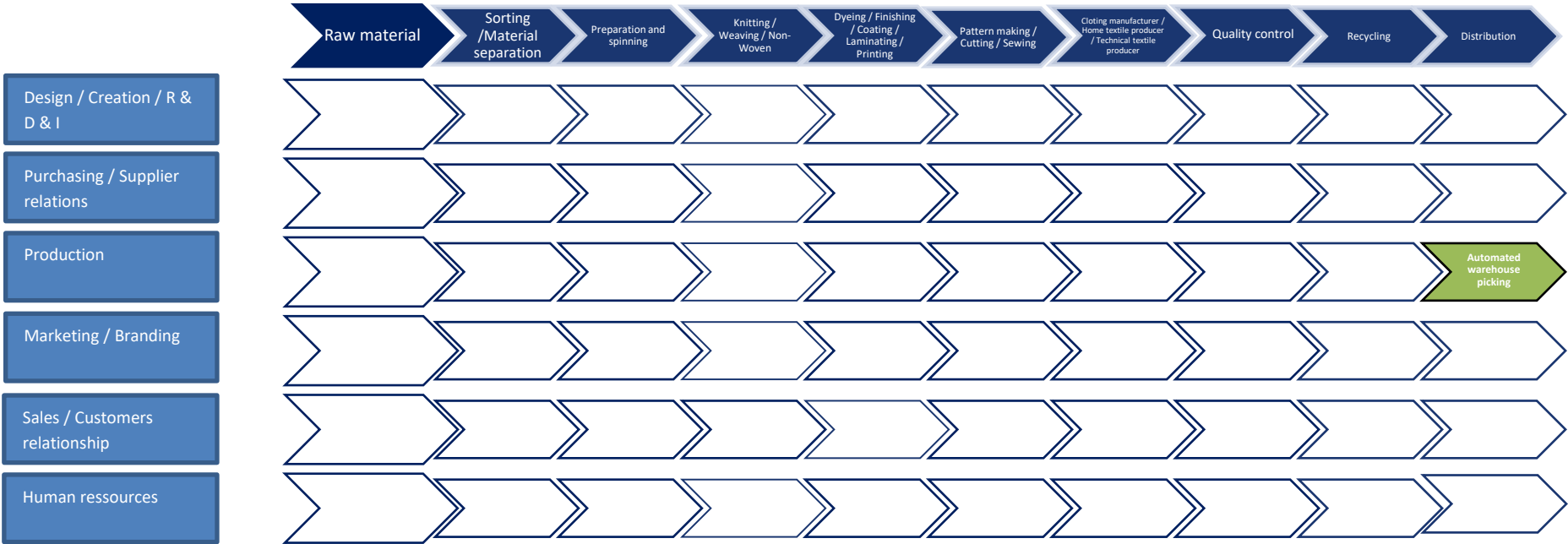
## 5. INTERNATIONAL

Impact on trade relations:

Eliminate product damage: Automated technology ensures the safe handling of products and minimizes product damage by eliminating workers from having to manually move product from one location to another. Less human interaction with product equals less damaged product.

Provide less shipping errors with just-in-time order fulfilment: With transportation being somewhat unreliable, automated technology can eliminate staged orders waiting to be picked up by implementing just-in-time (JIT) order fulfillment. The idea behind JIT order fulfillment is to prepare orders right when the truck arrives on site, as efficiently and quickly as possible. This frees up a great deal of warehouse space and keeps everything flowing.

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing



## CONTROL OF STORES AND WAREHOUSES STOCKS BY RFID

### 1. WHICH?

Companies: INDITEX

Market: Clothing and Fashion

Country: Spain

Textile value chain is: Retailer-Clothing-Finishing- Weaving and Kniting-Spinning

### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing / digital printing       | <input type="checkbox"/>            |
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| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making / Cutting / Sewing                       | <input type="checkbox"/>            |
| - Knitting                    | <input checked="" type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input checked="" type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/> | - Quality control (fabric / garment inspection)           | <input checked="" type="checkbox"/> |
| - Coating / laminating        | <input type="checkbox"/>            | - Distribution  | <input type="checkbox"/>            |
|                               |                                     | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

The company made a provision of 287 million euros due to the impact that the crisis will have on the valuation of its inventory, which hampered the evolution of its profit. Discounting the impact of this provision, the group's gross margin would have stood at 53.8% in the fourth quarter, the best figure in that period since 2016. The key, the group explained, has been better stock management thanks to the optimization of the store network and the implementation of the radio frequency identification system (RFID).

## 3. WHAT?

The reduction in stock is due, on the one hand, to the implementation of the radio frequency identification system (RFID), which by the end of next year will be implemented in all the chains and all the group's stores.

This system, increasingly widespread in the sector, allows us to maintain greater control, and much more updated, of the stock that is in stores. With this system, it is possible to integrate the stock of physical establishments and that of electronic commerce, which allows, for example, to use the inventory of stores for online orders.

It is necessary to make a big investment in equipment as readers, printers, tags, software, etc.

The stock of the company is now more controlled, allowing the company to reduce costs.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

It is necessary to acquire equipment for measuring RFID:

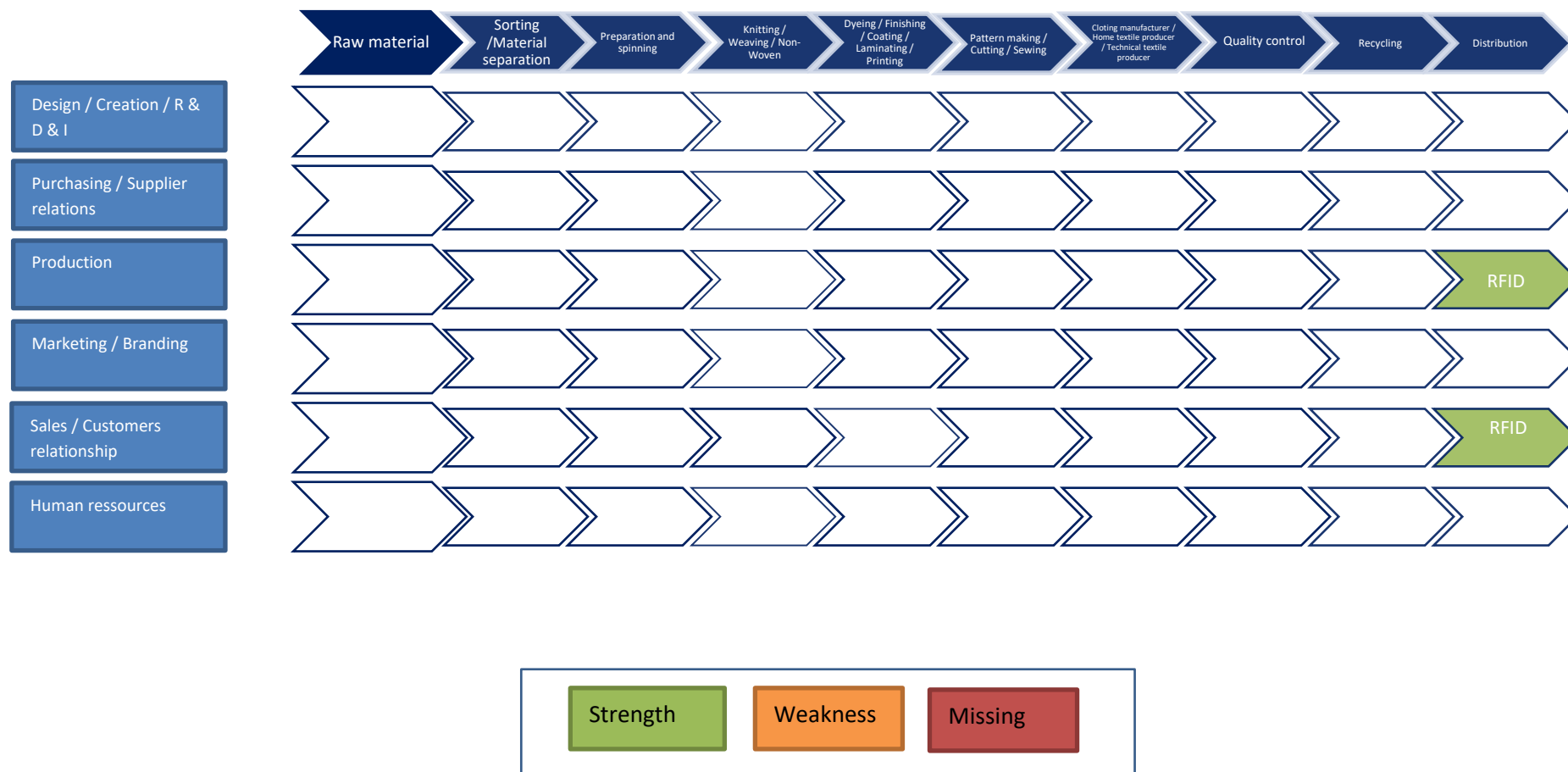
- RFID encoders
- Tags
- Printers
- Readers
- Etc.

It would be important to have a specialist company who has experience in this domain. It will be also necessary to control all the information provided by the RFID tags with a software.

## 5. INTERNATIONAL

More secure transactions and exchange of products. Updated information in real time about stocks and location of goods. Logistic operations more secure.

## CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



## TRACKING AND SUPPLY CHAIN MANAGEMENT BY RFID

### 1. WHICH?

Dipole develops RFID solutions for intelligent identification in order to optimize a wide range of business processes common to any market sector. **Data Suite™**, the ideal RFID software platform for the intelligent capture and management of your data captured with RFID, NFC, Barcode and other technologies.

#### MAIN MARKETS:

- |                      |                                     |             |                          |
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| - Coating / laminating        | <input type="checkbox"/>            | - Distribution  | <input checked="" type="checkbox"/> |
|                               |                                     | - Recycling   | <input checked="" type="checkbox"/> |

## 2. WHY?

Use for a chain made up of manufacturing, inventory control: a fiber producer, fiber dyeing producer, yarn spinning producer, knitting and finishing producer, distributor, logistics, automatic object tracking and supply chain management and a textile retailer.

In manufacturing RFID can be used to avoid product and component mixing, and mixing of different accessories.

RFID technologies may improve the potential benefits of supply chain management through reduction of inventory losses, increase of the efficiency and speed of processes and improvement of information accuracy

- It is able to control in real time the physical movements of goods, containers, people, returnable assets and others
- without human intervention
- It can be easily integrated into any ERP, WMS, MES, business management software or any other application, even in other Kanban, Lean or other procedures
- Cross ID-System: Prepared to use any data capture technology or in combination with several of them.
- Integration Plugins: It has different Plugins to connect to a wide variety of computer platforms.
- Easy to use, install, connect and operate. You don't need to learn RFID and NFC technologies in depth
- Provides data ready to be used: "what" was read, "where" was read, "when" was read
- Optionally you can get the "status" and "addressability".

## 3. WHAT?

Is not the only identification technology: Barcode systems, although used for product information, inventory control, have some drawbacks as compared to RFID. The amount of information stored in a barcode is very less as compared to RFID. An RFID is specific to each item, whereas the barcode is not. Barcode needs human interaction for proper operation. It requires time-of-sight access to an optical scanner for the product related information. The barcode is to be replaced if the information it contains needs modification but in RFID it can be modified at stages of the supply chain by the interaction between the microchip and the reader software. The barcode system is less accurate as compared to

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

Consultants with experience implementing RFID

On-site training. "Look for a consultant who can provide on-site training. Off-site product classes are good, but hands-on training with your specific solution is far better.

Main points of the training could be:

Describe some of the operational factors that affect the read range of RFID systems

Describe the effect of antenna orientation on read range

List guidelines for reader-to-antenna connections

Explain what multipath reflection is

List sources of EMI

Describe what reader synchronization is

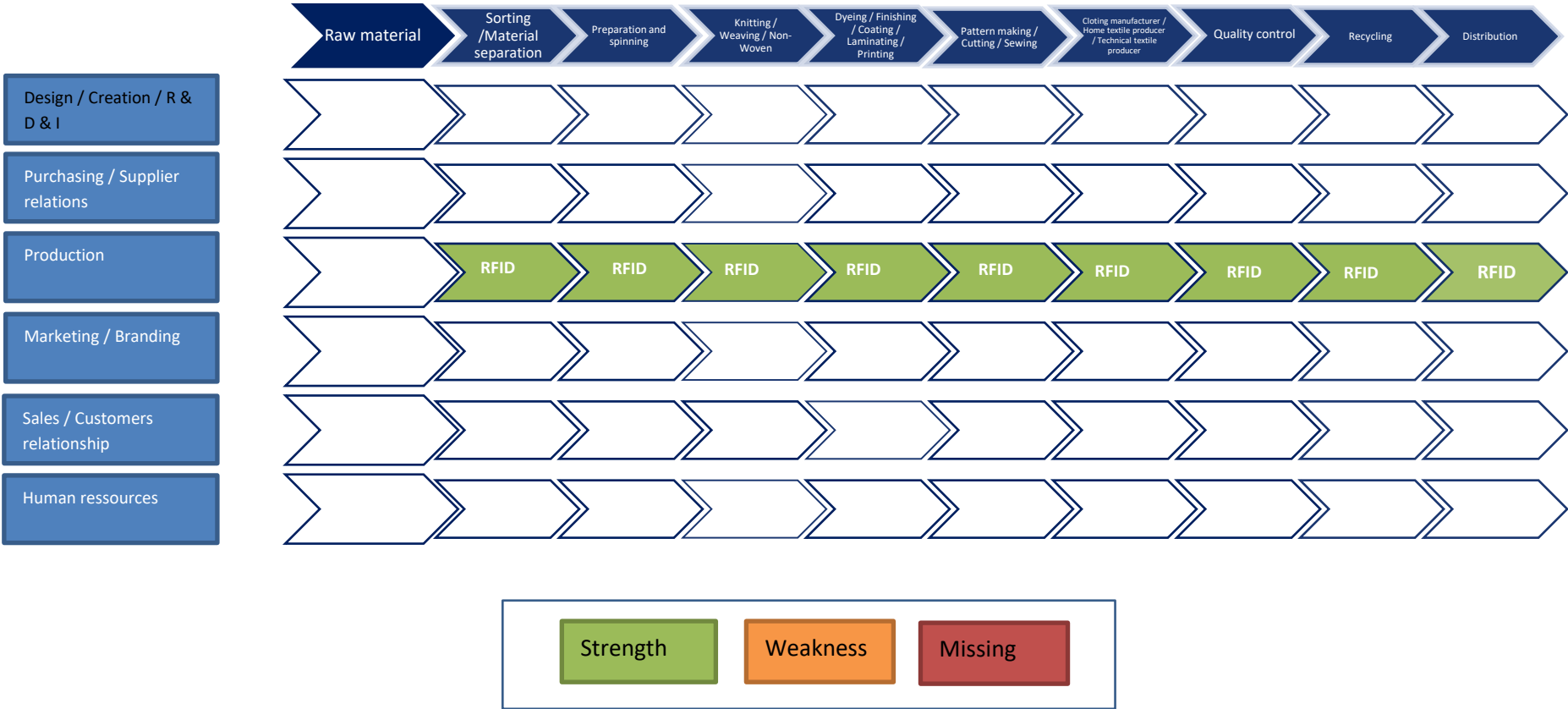
Describe how packaging can affect read range

## 5. INTERNATIONAL

Multiple communication link that connect multiple actors such as suppliers, carriers, importers, manufacturers and consumers. This system provide effective flow of information, materials, locations, stock quantity to all directions in the same time.

- Just in time deliveries
- In overseas transportation RFID can be used to track and trace the consignment before and after Free on Board, if product is outsourced
- Reduces lead-times, overall cost of operations
- Give full inventory history
- Provides total asset visibility
- Provides full process control for products in the facility

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



## MANUFACTURING EXECUTION SYSTEM (MES) FOR WEAVING MACHINES

### 1. WHICH?

Companies: Textiles Joyper  
Market: Home Textiles  
Country: Spain

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input checked="" type="checkbox"/> |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input type="checkbox"/>            |             |                          |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
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| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making / Cutting / Sewing                       | <input type="checkbox"/>            |
| - Knitting                    | <input type="checkbox"/>            | - Clothing manufacturer                                   | <input type="checkbox"/>            |
| - Weaving                     | <input checked="" type="checkbox"/> | - Home textile producer                                   | <input checked="" type="checkbox"/> |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              | <input type="checkbox"/>            |
| - Dyeing / Finishing          | <input type="checkbox"/>            | - Quality control (fabric / garment inspection)           | <input type="checkbox"/>            |
| - Coating / laminating        | <input type="checkbox"/>            | - Distribution  | <input type="checkbox"/>            |
|                               |                                     | - Recycling   | <input type="checkbox"/>            |



## 2. WHY?

Good practise: **software MES directly connected with the weaving machines**

Context: On the one hand, for years, the production control has been carried out via printed and Excel sheets. Due to this methodology all the history of stoppages and defects were on paper. Data was not known in real time, nor could it be intelligently analyzed to detect improvement opportunities. In addition, the total reliability of the data could not be guaranteed due to the human error factor. On the other hand, the weaving machines were not connected to any program, so to transfer the weaving patterns to all the machines old floppy disks, fragile and obsolete, were used.

## 3. WHAT?

The Implementation of Textile MES software for production control has meant the automation of data collection, eliminating the annotation of data on paper and human errors.

In addition, the network connection of the 18 Jaquard weaving machines with the MES means the disappearance of floppy disks. From the central server installed in production, weaving patterns can be transferred at high speed to each of the connected looms and the production data sent to the MES program. The communication is bidirectional, that is, requests can be made from the machine to receive the pattern.

Resources:

- One worker to check the MES

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

Textile MES Software

Software for the connection with the weaving machines

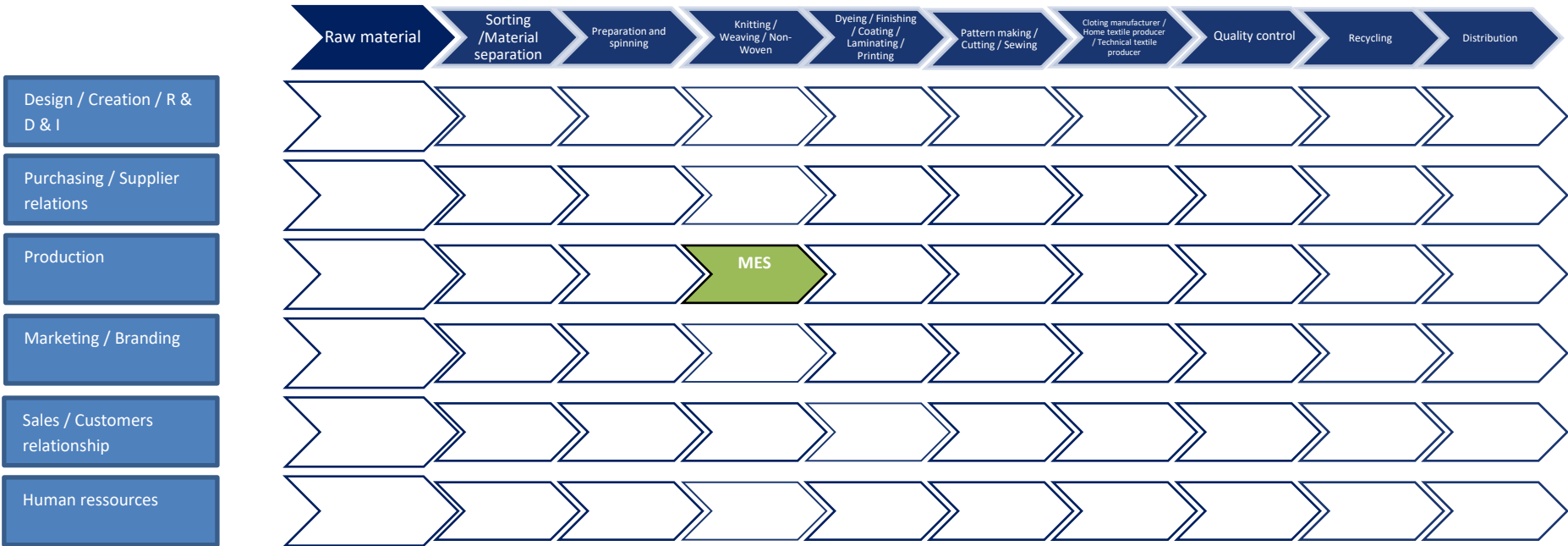
Interface: servers and screens

## 5. INTERNATIONAL

Improved positioning in the environment or other market advantages

With The technology, it is expected to strengthen the presence in foreign markets, on the one hand, by improving service to customers since this is a key aspect, and on the other, expanding designs and production. All this together with the improvement in the management of stocks thanks to the availability of data in real time, will allow optimizing the company's resources and therefore increasing markets.

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



## MANUFACTURING EXECUTION SYSTEM (MES) FOR SEWING COMPANY

### 6. WHICH?

Companies: Textiles Joyper  
Market: Home Textiles  
Country: Spain

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
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|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
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- |                               |                          |   |                                     |
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| - Sorting/Material separation | <input type="checkbox"/> | - Pattern making / Cutting / Sewing                       | <input checked="" type="checkbox"/> |
| - Knitting                    | <input type="checkbox"/> | - Clothing manufacturer                                   | <input type="checkbox"/>            |
| - Weaving                     | <input type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/> | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input type="checkbox"/> | - Quality control (fabric / garment inspection)           | <input type="checkbox"/>            |
| - Coating / laminating        | <input type="checkbox"/> | - Distribution  | <input type="checkbox"/>            |
|                               |                          | - Recycling   | <input type="checkbox"/>            |

## 1. WHY?

The production activity in the apparel industry, more specifically in those companies known as CMT – Cut, Make and Trim, require a great amount of human labour, most notably in the sewing phase. This factor contributes to the absence of real-time data from this activity with the adequate quality and volume, something that hinders an effective production control, the ability to react quickly to problems and the continuous improvement of the process. The good practice here described consists in the adoption of an IT tool (a tool that can be classified as a **Manufacturing Execution System**) to collect data in real-time and support the management of production orders, providing an analytical interface, with dashboards, that allows the company to get a bigger, more detailed and accurate view of its production process.

## 2. WHAT?

The adopted solution collects data from the shop-floor and that data enables a more efficient and effective production control. The MES system couple with real-time data strengthens the management practices of various processes, namely production control, quality control and quality management. The changes introduced impacted positively these processes. As expected, attention to training and support of users was a critical success factor. The investment made was deemed viable. This was an off-the-shelf solution, with an upfront cost accessible for an SME, a solution that did not demand no complex change or upgrade to the IT infrastructure of the company.

## 3. HOW? TECHNOLOGIES / ORGANIZATIONS

The system provided by the IT supplier / partner (Prodsmart) puts a smartphone at each workstation, allowing the operator to easily input the number of items produced. These smartphones are connect through a secure wi-fi network and the data is stored on a local server. This data is used by the MES to monitor the operations, feeding dashboards that can give real-time feedback to users, namely the workers on the shop-floor.

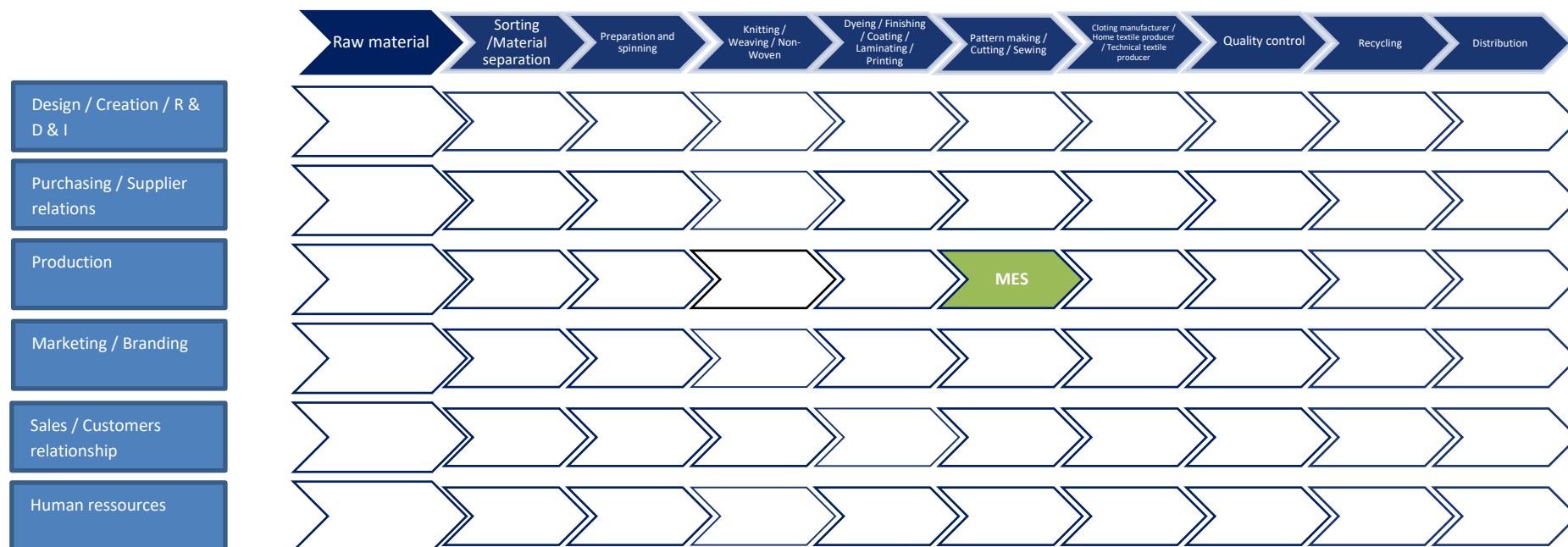
The use of smartphones is a cost-effective way of adding to the workstation the feature of real-time collection of data. However, because the data input is manual, the meaning of “real-time” Is not strictly correct, but the delays on the data collection are admissible in this context.

The use of smartphones has also another advantage, which is the fact that almost every worker is a mobile phone user, so if they are faced an interface that looks like an app and provides the same kind of interaction, the changes of a positive adoption are higher.

See <https://youtu.be/hIJRkyRD4hw> for a video of the adopted solution in Fonte e Faria, Lda.

## 4. INTERNATIONAL

## CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing

## AI FOR PREDICTIVE MAINTENANCE FOR CUTTING MACHINE

### 1. WHICH?

France Confection is a French clothing company. It makes clothes for the French brand of Smuggler suits. France Confection belongs to the brokerage group Molitor (parent company).

Their project includes a partnership with Microsoft (large American group) and Lectra (French company), and is financed by the ADEME, the New Aquitaine Region and the French Ministry of the Economy to the tune of 13 million euros over 18 months.

The company was placed in receivership in 2020 before the end of the project presented here, but a takeover project is underway.

### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Oekotech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

### TEXTILE VALUE CHAIN:

- |                               |                          |   |                                     |
|-------------------------------|--------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/> | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input checked="" type="checkbox"/> |
| - Sorting/Material separation | <input type="checkbox"/> | - Pattern making  | <input type="checkbox"/>            |
| - Knitting                    | <input type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/> | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input type="checkbox"/> | - Distribution  | <input type="checkbox"/>            |
| - Coating                     | <input type="checkbox"/> | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

Dematerialization, archiving and the use of Artificial Intelligence enable the structuring of data and the optimization of the use of production tools with predictive maintenance solutions. The life expectancy of the machines is thus extended and production processes are being optimised. This reduces maintenance costs on the long term, and maintains production level by avoiding breakdowns.

## 3. WHAT?

In this project, Lectra supplies the computer-aided robotic cutting machines and Microsoft carries out predictive maintenance projects on the garment machines. Smuggler's operators will be trained by Microsoft on the new robotic machines and on the procedures for setting up, monitoring and maintaining the production tools. Via a production tool data analysis system provided by Microsoft, the operators are aware of component wear and tear, and can identify the signs of a possible failure and thus prevent breakdowns from occurring.

On a daily basis, this tool requires:

- Operators trained in the maintenance and use of the machine
- A team trained in predictive maintenance and aware of the importance of predictive maintenance

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

This digitalization is part of a project aiming to reindustrializing French regions by relying on advanced technologies and to perpetuate a know-how on French territory. The integration of artificial intelligence at Smuggler has in fact been achieved through collaborations with leading players in the sector (Lectra and Microsoft) and with the support of the public authorities.

The AI technology involved requires advanced expertise, and therefore represents a very significant initial cost: operators training and a significant amount of time to archive and restructure the data are necessary. This partnership format supported by the public authorities has enabled the SME to limit the risks in terms of investment.

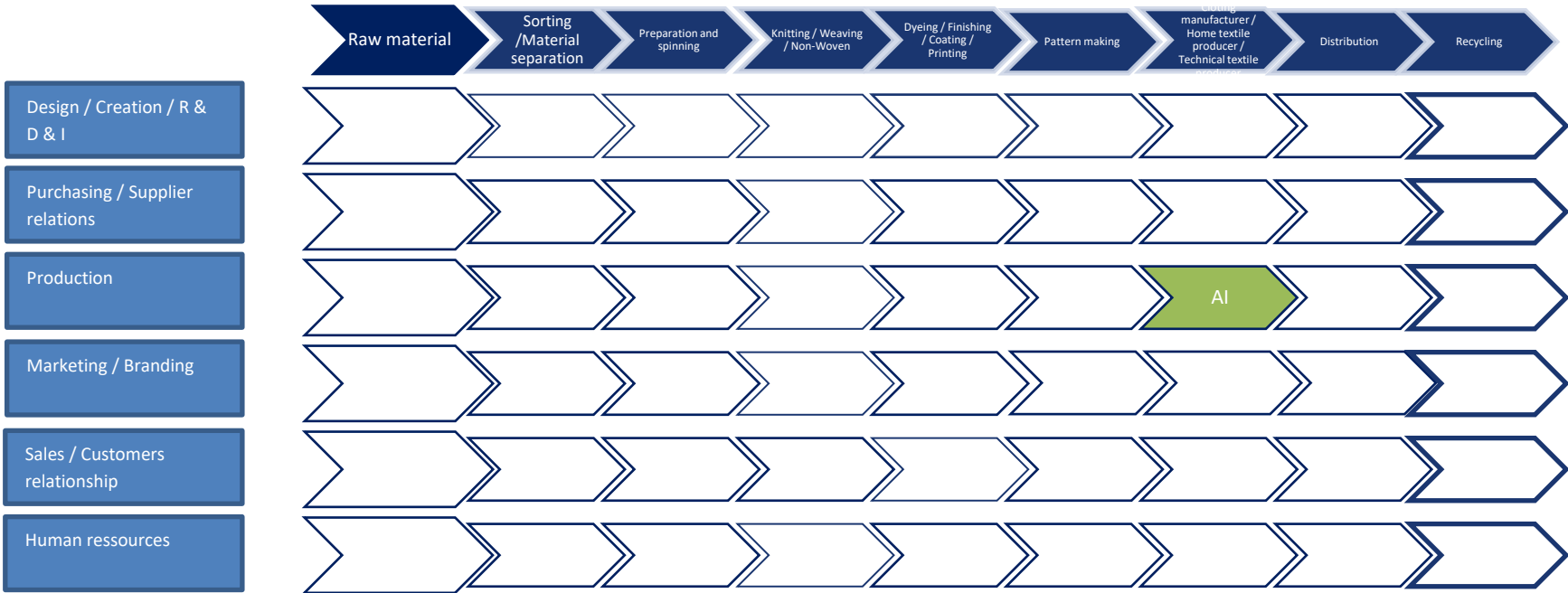
## 5. INTERNATIONAL

This process involves (in this example) an international partnership to bring in the AI expertise needed to carry out the project. On the international markets, this modernization of the production process should improve the competitiveness of the company by optimizing its production process to enable it to generate a higher added value.

## 6. SOURCES

<https://www.usine-digitale.fr/article/comment-microsoft-veut-aider-smuggler-pme-du-textile-a-construire-l-industrie-4-0.N885834>

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE





## QUALITY CONTROL - VISIONNICS AND AI

### 1. WHICH?

Company: Tejidos Royo <http://www.tejidosroyo.com/>

Market: Clothing and Fashion

Country: Spain

Textile value chain is: Retailer-Clothing-Finishing- Weaving and Kniting-Spinning

### MAIN MARKETS:

- |                      |                                     |             |  |
|----------------------|-------------------------------------|-------------|--|
| - Home textiles      | <input type="checkbox"/>            |             |  |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/>                                     |
|                      |                                     | Buildtech   | <input type="checkbox"/>                                     |
|                      |                                     | Clothtech   | <input checked="" type="checkbox"/> <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/>                                     |
|                      |                                     | Homotech    | <input type="checkbox"/>                                     |
|                      |                                     | Indutech    | <input type="checkbox"/>                                     |
|                      |                                     | Meditech    | <input type="checkbox"/>                                     |
|                      |                                     | Mobitech    | <input type="checkbox"/>                                     |
|                      |                                     | Packtech    | <input type="checkbox"/>                                     |
|                      |                                     | Protech     | <input checked="" type="checkbox"/>                          |
|                      |                                     | Sportech    |  |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |  |

### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing / digital printing       | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input checked="" type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making / Cutting / Sewing                       | <input checked="" type="checkbox"/> |
| - Knitting                    | <input type="checkbox"/>            | - Clothing manufacturer                                   | <input type="checkbox"/>            |
| - Weaving                     | <input checked="" type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/> | - Quality control (fabric / garment inspection)           | <input type="checkbox"/>            |
| - Coating / laminating        | <input type="checkbox"/>            | - Distribution  | <input type="checkbox"/>            |
|                               |                                     | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

Tejidos Royo has implemented a system of machine assisted vision to automatically monitor and control the quality of its products. The system detects defects by a computer vision system and reduces losses by detecting the exact meter where the defect is located. This system reduces the textiles with defects sent to customers and increases the satisfaction of the customer by ensuring and sorting zero defects textiles.

## 3. WHAT?

The system consists on a high-speed camera connected to a computer that controls by artificial intelligence (AI) algorithms the defects on textiles. During the manufacturing process, the system checks if there is a defect on the textile. When a defect is detected the system identify where is located so it is possible to eliminate this piece of textile before delivering to the customer. By doing this, the customer always receives the textile without any defect.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

The technology required is:

- High speed cam
- Computer
- Software and AI algorithms

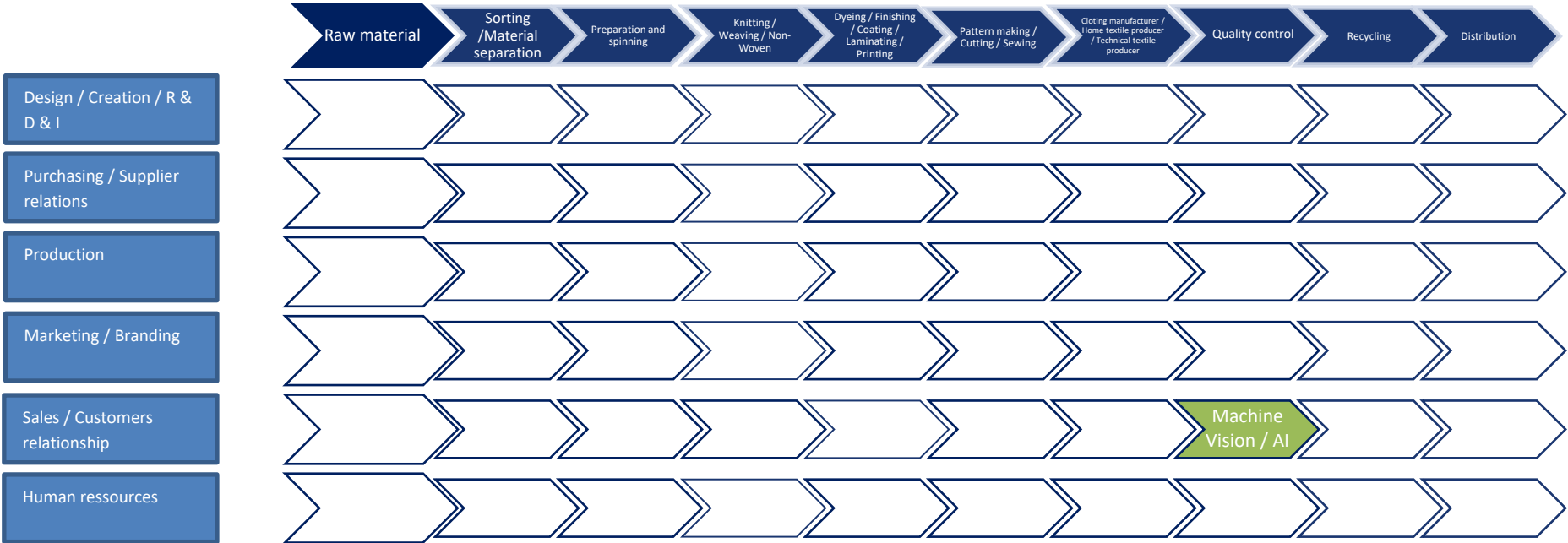
To implement this technology it is important to have a specialist company who can adapt and customize the system to the most common defects of the company and type of textiles.

## 5. INTERNATIONAL

Impact on trade relations:

This technology improves the relationship between customer-producer because the customer receives the textile without any defects, and this improves its satisfaction.

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing

## AUTOMATIZED QUALITY CONTROL ON KNITTING MACHINE

### 1. WHICH?

Hata, Lda, is a knitting company located at Viana do Castelo, in the North of Portugal, and it is owned by another company, Tintex, Lda (<https://www.tintextextiles.com/>), a dyeing and finishing company. Hata works almost exclusively for Tintex.

The IT partner is Smartex (<https://www.smartex.ai/>), a start-up created in 2019 focused on advanced solutions for quality inspection, solutions based on computer vision, image processing and artificial intelligence. Their first product, still today in development is a system to identify defects in circular knitting machines.

### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                          |
|-------------------------------|-------------------------------------|---|--------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing / digital printing       | <input type="checkbox"/> |
| - Preparation and Spinning    | <input checked="" type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/> |
| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making / Cutting / Sewing                       | <input type="checkbox"/> |
| - Knitting                    | <input type="checkbox"/>            | - Clothing manufacturer                                   | <input type="checkbox"/> |
| - Weaving                     | <input checked="" type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/> |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                          |
| - Dyeing / Finishing          | <input type="checkbox"/>            | - Quality control (fabric / garment inspection)           | <input type="checkbox"/> |
| - Coating / laminating        | <input type="checkbox"/>            | - Distribution  | <input type="checkbox"/> |
|                               |                                     | - Recycling   | <input type="checkbox"/> |

## 2. WHY?

Quality control, although being part of quality management, is a critical operation for any company, and so it is for Hata, Lda. The costs of non-quality are well known from literature and from the personal experience of all professionals in this area. In this particular case, the focus are the circular knitting machines and the defects detection during its operations. Defects generated at this stage can go unnoticed till the garment final assembly. According to Smartex, 80% of the defects are produced during this operation.

The main practice to highlight in this case is experimentation. Hata/Tintex contacted Smartex after the first public announcement of the creation of the start-up and their first prototype. Soon after the first prototype was installed in one knitting machine, a prototype still in an early stage of maturity and, consequently, with bugs and glitches to be solved and improvements to be made. This decision from Hata/Tintex is in contrast with the more traditional approach of the textiles companies, which is to adopt technology with a very high maturity and with proven record of real use in similar contexts. The expected gains are to be the first to reap the benefits of an emerging technology and to transform the ways they manage and operate their industrial process, gaining valuable knowledge and, therefore, competitive advantage.

For Smartex, this was a valuable opportunity to further develop their solution in real context, in reality, a co-development. At the moment, the newer version of the system is installed in 5 circular machines.

As for the technology of inspection installed, it allows the company Hata to have a more accurate defect detection, saving with savings in waste material and components, energy consumption and human labour.

## 3. WHAT?

As for the experimentation, this must happen within an adequate corporate culture and framework. It is necessary to recognize the higher risk of this kind of investment, an investment of money and time. It is necessary to have the right expectations and manage this process more like a project, a innovation, or even R&D, project.

As for the exploitation of the technology in itself, now the company has data in more quantity and quality about its knitting process. This fuels business processes, such as production management and quality management, with better data and allows a more effective continuous process improvement. The system has a direct impact on reduce waste due to features like stop automatically the machine if severe defect is detected.

The system has a software and a hardware components.

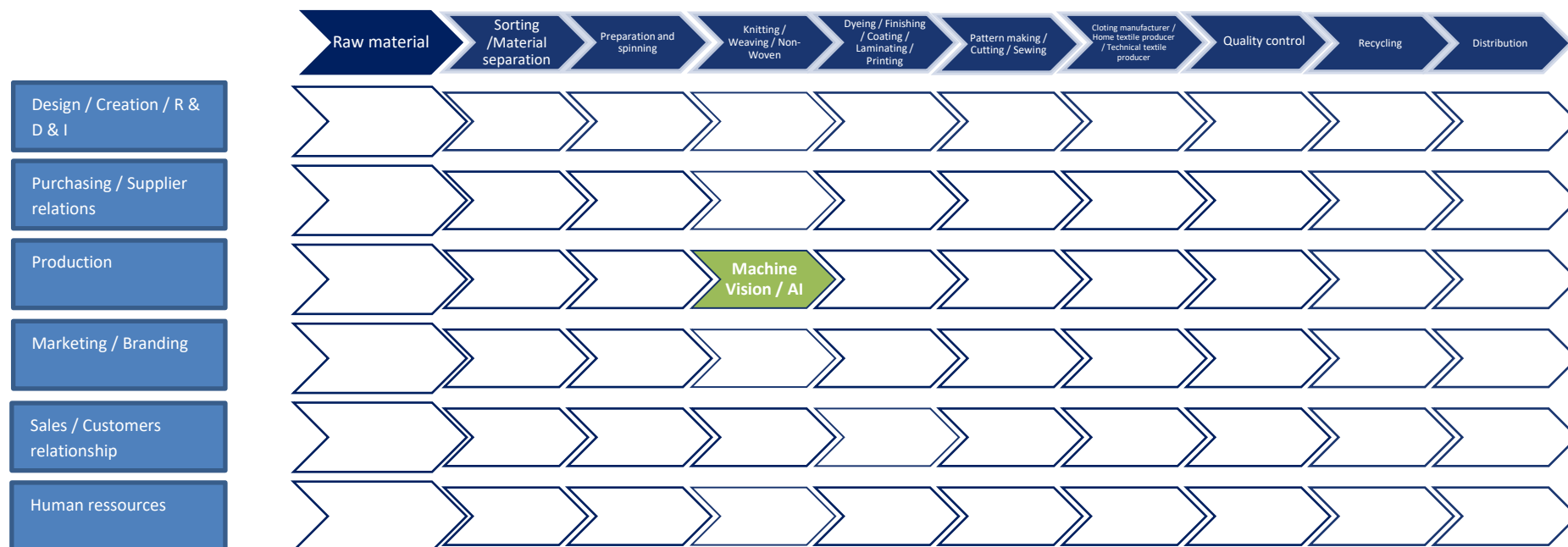
## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

Experimentation is more management science than an exact science, as expected. Has the nature of a project, demands a more accurate risk analysis exercise and requires most of the times to work in close cooperation with other partners, such as R&D centres, technology suppliers and even customer.

## 5. INTERNATIONAL

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## CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing

## DIGITALISATION OF QUALITY CONTROL TOOLS

### 1. WHICH?

TDV Industries is a French manufacturer of technical and functional textiles and fabrics for workwear, protective clothing and industrial applications.

#### MAIN MARKETS:

- |                      |                                     |             |                                     |
|----------------------|-------------------------------------|-------------|-------------------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                                     |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/>            |
|                      |                                     | Buildtech   | <input type="checkbox"/>            |
|                      |                                     | Clothtech   | <input type="checkbox"/>            |
|                      |                                     | Geotextiles | <input type="checkbox"/>            |
|                      |                                     | Homotech    | <input type="checkbox"/>            |
|                      |                                     | Indutech    | <input type="checkbox"/>            |
|                      |                                     | Meditech    | <input checked="" type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/>            |
|                      |                                     | Oekotech    | <input type="checkbox"/>            |
|                      |                                     | Packtech    | <input type="checkbox"/>            |
|                      |                                     | Protech     | <input checked="" type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/>            |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                                     |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input checked="" type="checkbox"/> | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input checked="" type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input checked="" type="checkbox"/> | - Pattern making  | <input type="checkbox"/>            |
| - Knitting                    | <input checked="" type="checkbox"/> | - Clothing manufacturer                                   | <input type="checkbox"/>            |
| - Weaving                     | <input type="checkbox"/>            | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              | <input checked="" type="checkbox"/> |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/> | - Distribution  | <input type="checkbox"/>            |
| - Coating                     | <input type="checkbox"/>            | - Recycling   | <input type="checkbox"/>            |



## 2. WHY?

TDV Industries has digitised its fabric quality control process. In order to detect defects, operators are equipped with scanning devices and digital controls. These tools allow a better reliability of the result, a greater speed of control and a better comfort for the operator. In this way, the company has saved more than 140 kilos of paper per year.

This practice also makes it easier to identify recurring imperfections/non-conformities more accurately and to remedy them.

## 3. WHAT?

On a daily basis, these tools reduce the amount of time spent on product quality controls, both on fibres, weaving, shape... In terms of resources, this practice requires :

- One or more people in charge of tool maintenance,
- One or more people in charge of monitoring the new scanning tools proposed and which could be better suited to the products, or adapted to a new range of fabrics being planned.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

This practice is adapted to textile manufacturers (weaving, coating, printing...).

In terms of launch, a time of study of the scanners on the market is to be expected in order to determine which ones will be the most adapted to the company's products. In addition, it is necessary to determine whether the company has a sufficient budget to identify and procure scanning equipment for all products or whether some have priority (higher added value, more recurrent non-conformities...). Time should also be set aside for testing and training quality operators in the use of the machines.

## 5. INTERNATIONAL

## 6. SOURCES

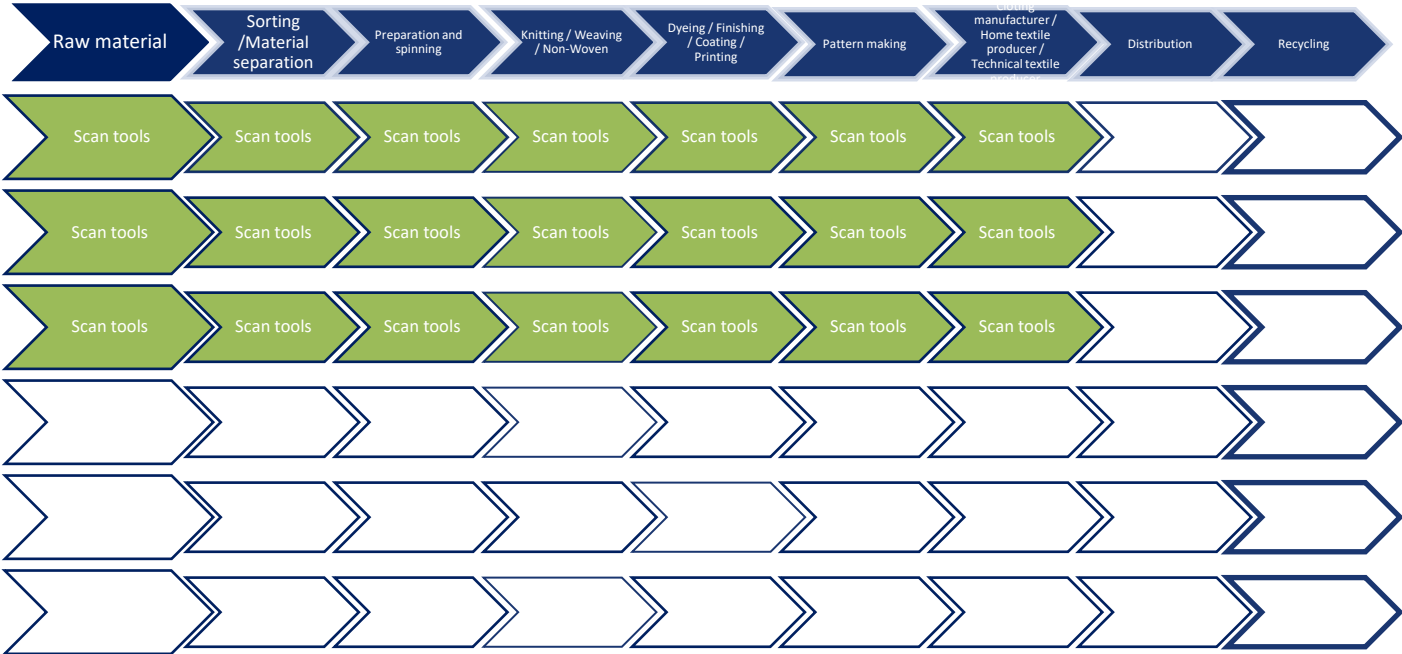
### Online newspapers:

<https://www.modeintextile.fr/interview-christophe-lambert-president-de-tdv-industries/>

**Video platform:** <https://www.dailymotion.com/video/x6h0yqb>

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE

- Design / Creation / R & D & I
- Purchasing / Supplier relations
- Production
- Marketing / Branding
- Sales / Customers relationship
- Human ressources



Strength

Weakness

Missing

## AUTOMATION SYSTEM FOR PROCESS CONTROL FOR DYING

### 1. WHICH?

EAS are experts in process automation solutions for the textile industry.

InfoTint is a full control system for Dyeing companies. It is a multitasking system, which works actively in the production.

EAS: [www.escarre.com](http://www.escarre.com)

Hidrocolor a dyeing and finishing textile company has implemented the software

### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input checked="" type="checkbox"/> |             |                          |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                          |
|-------------------------------|-------------------------------------|---|--------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing / digital printing       | <input type="checkbox"/> |
| - Preparation and Spinning    | <input type="checkbox"/>            | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/> |
| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making / Cutting / Sewing                       | <input type="checkbox"/> |
| - Knitting                    | <input type="checkbox"/>            | - Clothing manufacturer                                   | <input type="checkbox"/> |
| - Weaving                     | <input type="checkbox"/>            | - Home textile producer                                   | <input type="checkbox"/> |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                          |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/> | - Quality control (fabric / garment inspection)           | <input type="checkbox"/> |
| - Coating / laminating        | <input type="checkbox"/>            | - Distribution  | <input type="checkbox"/> |
|                               |                                     | - Recycling   | <input type="checkbox"/> |

## 2. WHY?

Automation system that allows controlling all the processes of a dyeing and finishing company: stock of chemical products, dosing of chemical products, smart recipes, laboratory, and production machines.

The laboratory recipe is created in InfoTint. From the trichromy InfoTint calculates the complete recipe with the chemicals, auxiliaries and salt. Management to create the colour. Historical of all testing and corrections. Formulas based on the article composition. Ability to define dye-stuff and articles only for the laboratory or also for production. Validation and automatic transfer to production of the accepted trichromies. Load management for the laboratory dyeing machines. InfoTint can connect to automatic dispensing systems for laboratory (dye-stuff, chemicals and auxiliaries).

Smart Recipe: total cost control, taking into account all consumptions (time, water, steam, electrical energy, chemicals and dyes). The costs are theoretical or real, depending on whether it is before or after the dyeing operation, and the deviations can be compared later. Creation of mother recipes as a union of processes. Possibility of assigning process variables (components) defined by the user depending on the machine group (speeds, overfeeds, etc.). Calculation of recipe costs, printing of production sheets. Management of products, product families, typology for automation and product suppliers. Management of product stocks. Consumption forecast.

The dosing system TECNODOS does not need any specific installation for the storage of chemical and auxiliary products and lets us use the existing storage areas and/or tanks. Level control are available or avoiding errors due to missing products. Products are aspirated and sent by a tri-lobe pump, with high performance and resistance to chemical products. A high precision of electromagnetic or mass flowmeter will do the counting. Once the product is in the machine tank, a line cleaning is done (configurable).

The technical Staff responsible of preparing the recipe will not handle the chemicals or auxiliary products. The quantity of products and auxiliaries for dyeing is always adjusted and will always be the same, therefore the quality of the article will be identical in any batch. There is no dye contamination.

**AUTOMATION**: In the factory, InfoTint allows direct connection with the machine controllers, with dosing systems for liquid products (auxiliary and chemical) and colorants, connection to scales or rotating warehouse. In this way we obtain a total control and record of each and every one of the parameters of the dyeing batches.

## 3. WHAT?

No expert dyeing people needed to manage the process: you can dye 6 millions of fabric meters with only 2 person without any knowledge in terms of dyeing.

Save chemical and auxiliary products. There is a 40% savings on chemical / auxiliary products.

The customer's batch will always be dyed with the same fixed parameters. This assure to obtain the same color and characteristics in different lots/batch. Right first time RFT.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

Dyeing machines, continuous machines (finishing, washing machines, etc.) and laboratory machines. We need the Driver connexion and the training of the staff.

## 5. INTERNATIONAL

EXTERNAL CONNECTION TO AN ERP: different ERP can be connected and share the following information with the trade relations

Regarding the Administration, InfoTint is prepared to receive from any ERP the batches registry, customers, colours, articles, chemicals, dye-stuff, etc. Also it is prepared to send to the ERP every production data as initiation and ending of the batches, timings, costs, online consumption of products, alarms, formulas, etc.

The system allows the transfer of planning from the outside and on the other hand, the delivery of data production and consumption to the central system.

Ability to add custom fields depending on the client, which can then be included in the dyeing program.

The aim of this module is to get the criteria of the dyer into the system. Therefore it is always processed in the same way regardless of who made the planning.

The standard driver transmission includes sending to your client and receiving from other clients the following data:

Batches, recipes and processes.

Formulas with the quantities calculated.

Customers, articles and colours.

Products, regulation of stock, warehouse income.

Start and end of batch.

Consumption (in real time or at the end of the batch).

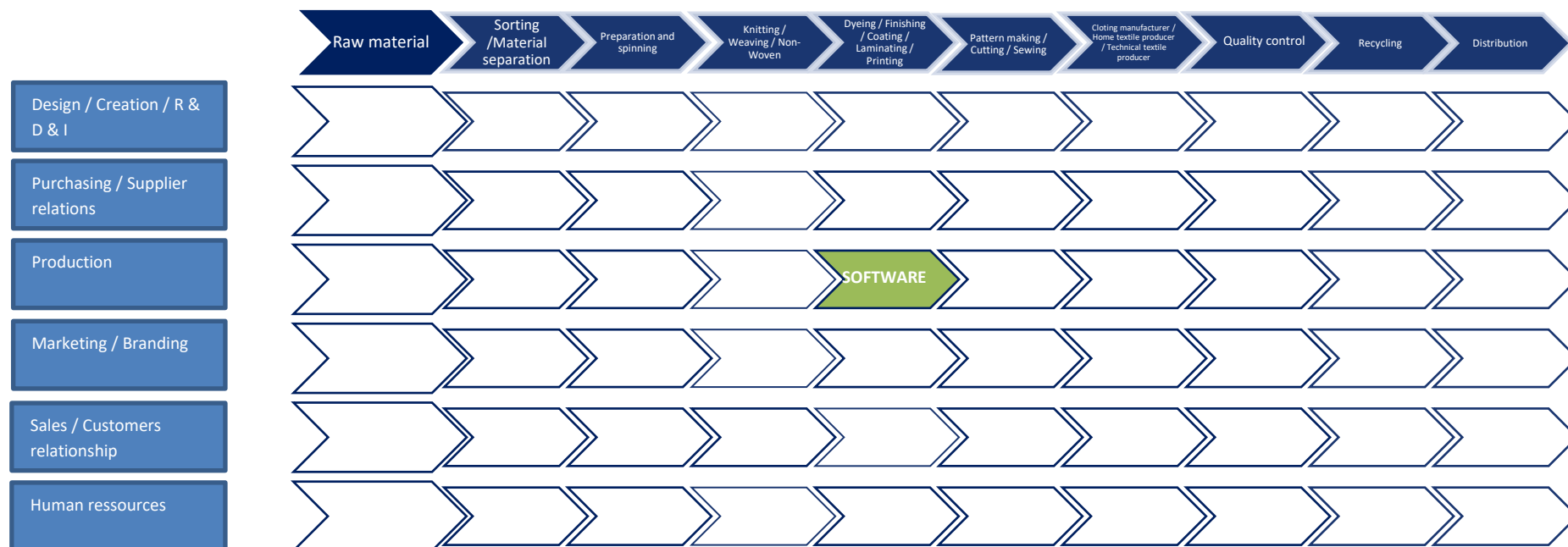
Dosing request

Remote activation of a batch.

Quantity of Staff (operators).

Ability to customize fields to include.

## CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



## 4.0 MACHINE ROOM

### 1. WHICH?

Lectra is a French group, world leader in integrated technological solutions for companies using leather or textiles (design, product development, cutting). The company develops, among other things, product lifecycle management solutions, computer-aided design (CAD) solutions, cutting room software, single-ply or multi-ply cutting machines and quilters.

The Marck Group is a French industrial group that designs and markets solutions in uniforms, equipment and services to administrations and private companies in France and abroad. It is made up of 6 specialised subsidiaries including Balsan, a French company that designs and manufactures corporate clothing (also known as identity clothing or image clothing) in industrial sizes or made-to-measure.

Vilmers is a Lithuanian manufacturer of modular furniture and offers a choice of more than 250 fabrics and colours for 85 sofa modules.

### MAIN MARKETS:

- |                      |                                     |             |                                     |
|----------------------|-------------------------------------|-------------|-------------------------------------|
| - Home textiles      | <input checked="" type="checkbox"/> |             |                                     |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/>            |
|                      |                                     | Buildtech   | <input type="checkbox"/>            |
|                      |                                     | Clothtech   | <input type="checkbox"/>            |
|                      |                                     | Geotextiles | <input type="checkbox"/>            |
|                      |                                     | Homotech    | <input type="checkbox"/>            |
|                      |                                     | Indutech    | <input type="checkbox"/>            |
|                      |                                     | Meditech    | <input type="checkbox"/>            |
|                      |                                     | Mobitech    | <input checked="" type="checkbox"/> |
|                      |                                     | Oekotech    | <input type="checkbox"/>            |
|                      |                                     | Packtech    | <input type="checkbox"/>            |
|                      |                                     | Protech     | <input checked="" type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/>            |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                                     |

### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input type="checkbox"/>            | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input checked="" type="checkbox"/> | - Pattern making  | <input type="checkbox"/>            |
| - Knitting                    | <input type="checkbox"/>            | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input type="checkbox"/>            | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input type="checkbox"/>            | - Distribution  | <input type="checkbox"/>            |
| - Coating                     | <input type="checkbox"/>            | - Recycling   | <input checked="" type="checkbox"/> |

## 2. WHY?

Lectra has launched *Fashion On Demand*, an integrated solution that automates on-demand production, from order reception to the cutting room and the product development phases. Companies using the machine can define the criteria and levels of personalisation for each item and then launch production without affecting their existing production flows.

An important advantage is that production times can be significantly reduced, on a ready-to-wear basis.

Balsan, a French manufacturer of uniforms for very different customers (SNCF, army, McDonalds team members...), was encountering a problem with the time spent changing patterns. Equipped with this solution, the change takes only a few minutes for the pattern makers and is done on computer. More generally, this tool allows Balsan to have non-centralised production sites, as production can be started remotely.

In the same concept: *Furniture on Demand*. Lectra offers a 4.0 cutting room dedicated to the customised production of upholstered furniture. This initiative is based on a digital cutting platform, permanently connected to a data hub, with permanent updating between the cutting room and the ERP in order to allow operators to make quick decisions. In order to optimise this process, a major R&D investment has been made in a new cutting machine (Vigra). This machine optimises cycle times by providing a complete cutting line for plain and patterned fabrics. It is therefore very quick to load, scan, cut and unload simultaneously.

85% of the sales of Vilmer, manufacturer of modular sofas, come from custom orders. The company was planning to move to 100% and equipped itself with Lectra's solution. This tool enables them to reduce their delivery times, thanks to the direct connection with their ERP system.

In both cases, the objective is to provide manufacturers with greater agility, more production capacity and therefore profitability. Machine users can provide consumers with more customisation and shorter delivery times, while at the same time significantly reducing the lack of stock and the use of paper and plastic for pattern making.

## 3. WHAT?

This type of system requires, on a daily basis :

- One or more people in charge of updating and monitoring the ERP,
- A maintenance team for the maintenance of the machine.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

This practice can be applied to textile companies in the clothing, fashion, technical textiles and furnishing sectors. It is particularly interesting for companies with a wide range of products and remote production sites.

At the start, this type of practice requires a high investment in machine purchase. In addition, it is necessary to have a fairly developed and characterised ERP, used by all sales staff. It is also necessary to take into account a more or less important time of connection and integration with the machine, as well as training of the employees.



## 5. INTERNATIONAL

If digitization includes an international value chain, what has been its impact on trade relations?

## 6. SOURCES

**Online newspapers:**

<https://www.modeintextile.fr/loffre-fashion-on-demand-de-lectra-revolutionne-personnalisation-lindustrie-de-mode/>

**Websites:**

[https://www.lectra.com/sites/default/files/lectra/press\\_detail/lectra\\_furniture\\_cutting\\_room\\_4.0.pdf](https://www.lectra.com/sites/default/files/lectra/press_detail/lectra_furniture_cutting_room_4.0.pdf)

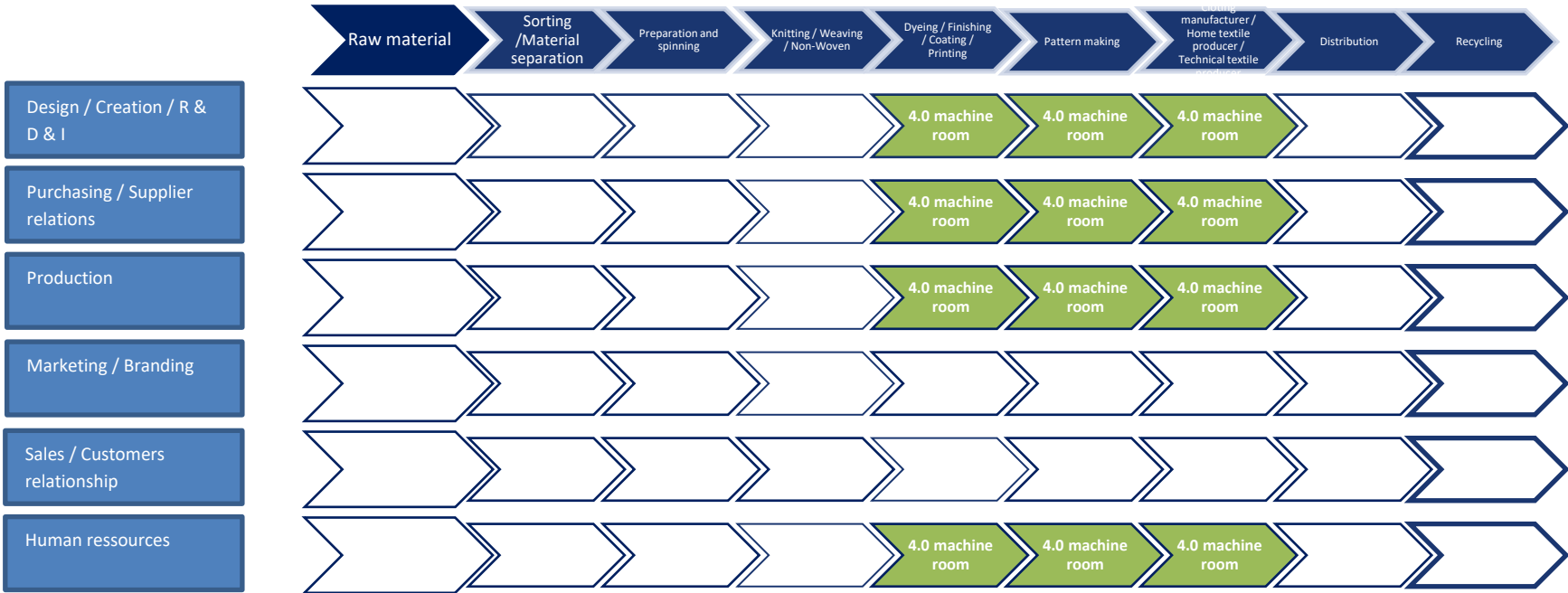
<https://www.lectra.com/fr/librairie/balsan-groupe-marck>

<https://www.lectra.com/sites/default/files/2019-08/customer-story-balsan-fr.pdf>

**Video platform:**

<https://www.youtube.com/watch?v=GhsAdbmOFkg>

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



StrengthWeaknessMissing

## DIGITAL KNITTING MACHINE

### 1. WHICH?

Kniterate is an English start up, manufacturer of an automatic knitting machine that also allows the creation and sharing of designs.

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input checked="" type="checkbox"/> |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Oekotech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

#### TEXTILE VALUE CHAIN:

- |                               |                          |   |                                     |
|-------------------------------|--------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/> | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input checked="" type="checkbox"/> |
| - Sorting/Material separation | <input type="checkbox"/> | - Pattern making  | <input checked="" type="checkbox"/> |
| - Knitting                    | <input type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input type="checkbox"/> | - Home textile producer                                   | <input checked="" type="checkbox"/> |
| - Non-woven                   | <input type="checkbox"/> | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input type="checkbox"/> | - Distribution  | <input type="checkbox"/>            |
| - Coating                     | <input type="checkbox"/> | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

Kniterate's digital knitting solution provides workshops and textile production companies with an access to a low-cost, largely automated machine that simplifies the process of designing and manufacturing knitted textiles. The solution offers a high degree of flexibility in production, in terms of design, colors, and does not require in-depth knowledge of textile processes. It is possible to use it in an industrial setting, but this machine is rather aimed at structures producing in small quantities, workshops and designers, as well as private individuals.

## 3. WHAT?

The user creates his design using the supplied software, K-Code. In this software, it is possible to create one's own design, to search for an existing design (and modify it), or to convert an image (for example a photo taken of a garment) into a design, thus reproducing an existing knitted fabric. Designs can be shared with other users of these machines via the software.

The design file is inserted into the machine using an SD card, and the machine starts manufacturing. It is possible to produce a jumper with several colours, patterns and stitches in 8 hours. The cost of the product is 10.000€. The investment is much lower than for a classic industrial sewing machine (within 42.000€). Other functions will be developed in the future, and it will be possible to produce other types of textile products. It is possible to use up to 6 bobbins of thread at the same time.

In everyday life, the use of this tool implies :

- Human intervention to place the right yarns on the machine before manufacturing. Some parts also require manual assembly of the independently manufactured fragments.
- A person in charge of maintenance,
- One or more persons in charge of modelling the patterns to be created with the machine

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

In order to implement this machine and process are needed:

- A machine investment,
- Training of operators on the software tool (as well as upstream for the design part)
- The possible search for new suppliers for materials

The use of the machine requires few personnel, as the majority of the process is automated.

The technologies used are Cloud Storage for retrieving and sharing designs, and programming for the design of designs and the conversion of photos into computer code, which will be read by the machine in order to determine the production process. All these aspects are managed by Kniterate.

## 5. INTERNATIONAL

## 6. SOURCES

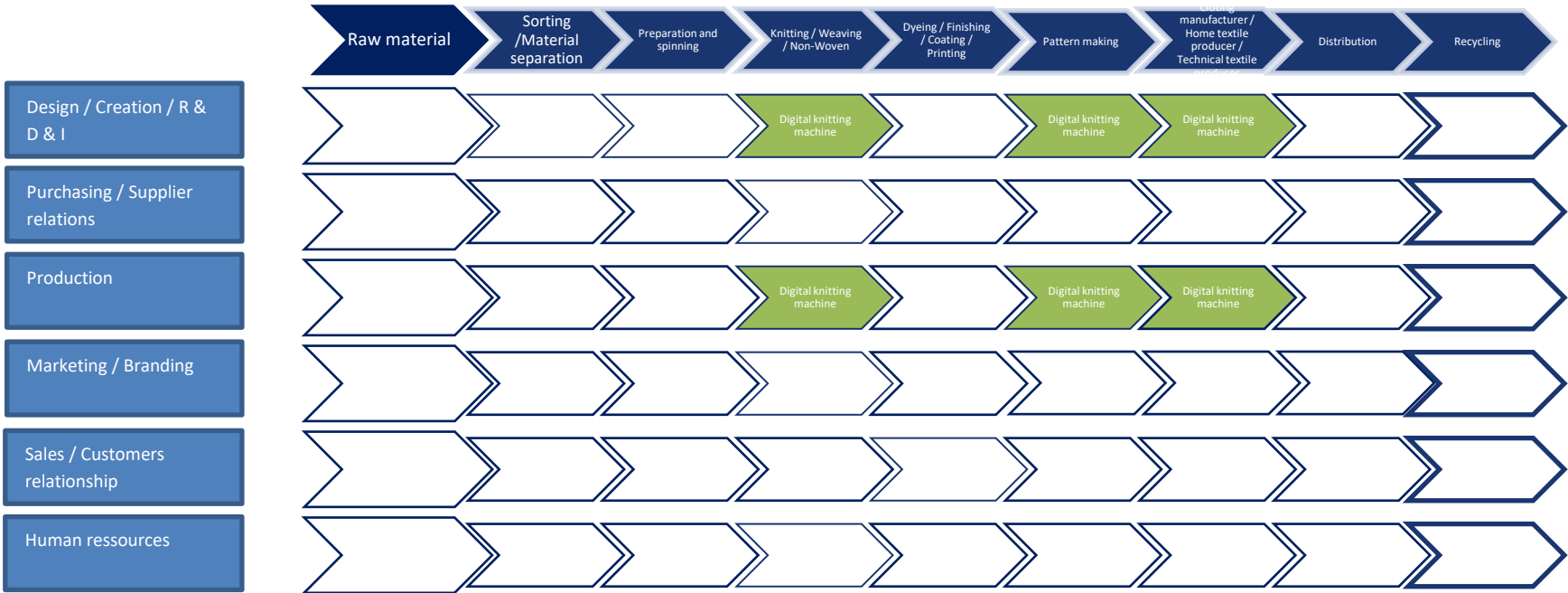
<https://www.usinenouvelle.com/article/l-industrie-c-est-fou-plus-besoin-de-tricoter-kniterate-le-fait-a-votre-place.N523459>

<https://www.kniterate.com/>

[https://www.youtube.com/watch?time\\_continue=383&v=Z3aL\\_rB2pro&feature=emb\\_title](https://www.youtube.com/watch?time_continue=383&v=Z3aL_rB2pro&feature=emb_title)

[https://www.youtube.com/watch?time\\_continue=47&v=Z3aL\\_rB2pro&feature=emb\\_title](https://www.youtube.com/watch?time_continue=47&v=Z3aL_rB2pro&feature=emb_title)

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing

## COMPUTER-ASSISTED FABRICS CREATION SOFTWARE - 3D VISUAL DIGITAL FABRIC SAMPLES

### 1. WHICH?

Penelope Cad Systems is a Spanish Company based in Barcelona and specialized in software development. Textile BCH S.A, Monti Group, Hugo Boss (Germany) is one of the brands that certifies the use of DMixCloud, a platform that uses the Penelope software.

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input checked="" type="checkbox"/> |             |                          |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                          |
|-------------------------------|-------------------------------------|---|--------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing / digital printing       | <input type="checkbox"/> |
| - Preparation and Spinning    | <input checked="" type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/> |
| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making / Cutting / Sewing                       | <input type="checkbox"/> |
| - Knitting                    | <input checked="" type="checkbox"/> | - Clothing manufacturer                                   | <input type="checkbox"/> |
| - Weaving                     | <input checked="" type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/> |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                          |
| - Dyeing / Finishing          | <input type="checkbox"/>            | - Quality control (fabric / garment inspection)           | <input type="checkbox"/> |
| - Coating / laminating        | <input type="checkbox"/>            | - Distribution  | <input type="checkbox"/> |
|                               |                                     | - Recycling   | <input type="checkbox"/> |

## 2. WHY?

For Design and production departments: Penelope Dobby CAD offers all the tools needed for the creation, design, production and simulation of all kind of designs created with a dobby loom. The hyper realistic fabric simulation accelerates the decision-making process involved in the creation of the collection while reducing the huge sample production, which means cost and time saving for the companies.

- Introduce quickly and accurately the colors by using colorimeter.
- Create all types of yarns (pains, mélange, slubs, mouliné, printed, and fancy yarns).
- Easily create complex ligaments and visualize them in 3D.
- Manage Jacquard selvages.
- Elaborate, manage and produce blankets with different combinations of designs.
- Generate designs and colorways automatically.
- Get a very detailed and customizable product data sheet.
- Search and make statistics on any item of the collection.
- Simulate all type of fabrics and effects (leno weave, seersucker, fil coupé, brushing effects, empty dents, double face).
- Generate files for all types of looms, drawer and sample warping machines.
- Organize and visualize the scheme of the creel in sectional warping machines.

One of the biggest expenses for the fabric producers is producing samples, because all the machinery needs to be operative for a very small outcome. A part from that, the samples need to be send and sometimes modified if needed. A software that offers the possibility of creating a 3D sample allows the fabric producers to save costs, a faster production of the samples, a faster communication among

## 3. WHAT?

Design and production departments worked separately and most of time the technical items, issues and terms involved on weaving and production were not taken into account by the design department. There is a retailer that needs to analyse and approve 5 different types of fabrics of one of its suppliers. The supplier will use the Penelope software to create a sample of each fabric, and the retailers' employees will receive it in a 3D format and instantly. In case that the retailer is not satisfied with the sample and wants to add some modifications, the supplier will be able to edit the sample that was already sent online.

The new tool Penelope Showroom allows to show their new collection to their clients around the world with realistic fabric simulations. Supplier is also providing online sessions with their agents who will show the latest news and give a full experience to the customer. Penelope has always maintained the fidelity and accuracy of the simulations produced before reaching the real production phase

Possibility of different fabric effects – Seer-sucker, Brushing, Melange, Grindle, Space Dyed, etc.

Speed to market – CAD to Bulk directly and eliminates need of desklooming/yardage making.

Design & Design information can be accessed & shared online directly between Design-Customer, Design-Production, Design-Other departments. Easy of uploading Design & its technical information to



#### 4. HOW? TECHNOLOGIES / ORGANIZATIONS

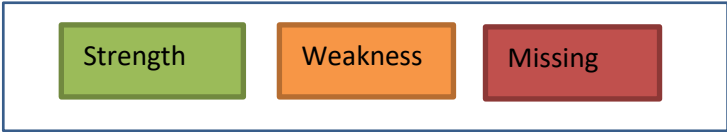
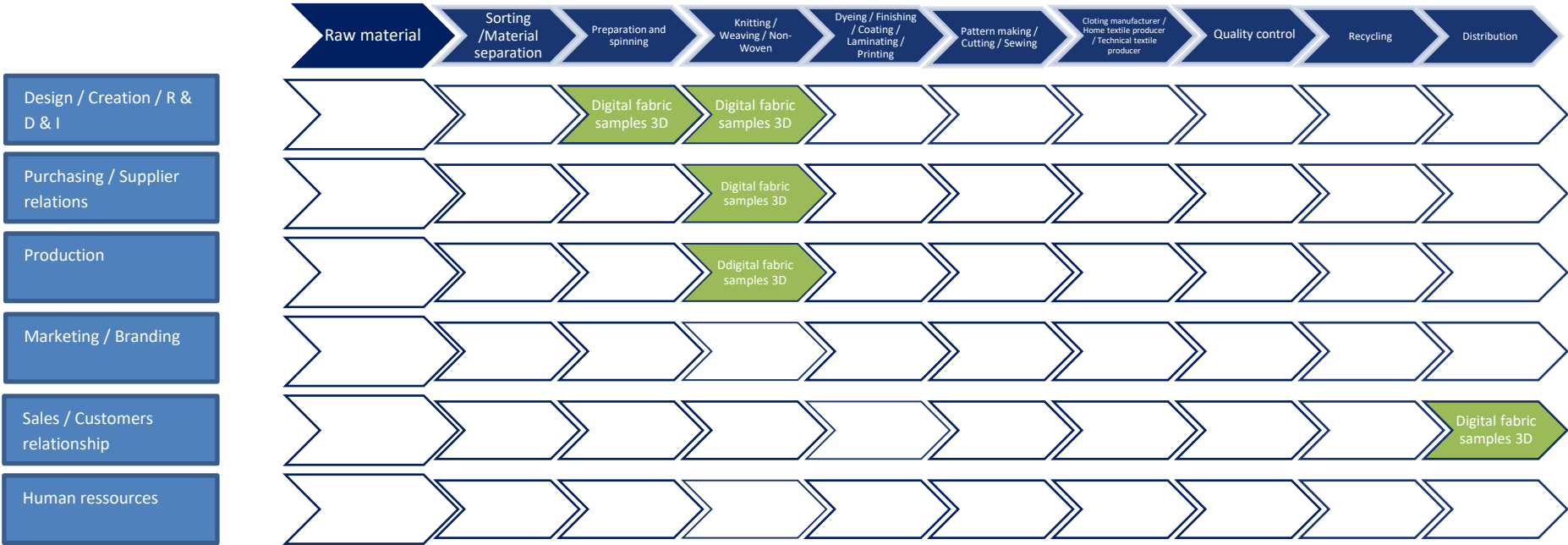
Both the supplier and the retailer must have access to the Penelope software or to a platform that is able to read the samples made by Penelope. The retailer will also have to receive an extended formation on how to use the software.

#### 5. INTERNATIONAL

The COVID-19 worldwide situation with mobility restrictions highlights the importance of being able to communicate quickly and effectively with the customers through “digital samples” that are identical to the ones that will be produced.

The Penelope software can easily export data, create collection folders in one unique shared database, used at the same time in all production plants and factories.

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



## MEASURING APPLICATION 3D FOR CUSTOMISATION

### 1. WHICH?

Thuasne is a French group that designs, develops and manufactures medical devices, mainly orthoses. The group's expertise mainly covers the fields of orthopaedics, medical compression and home support.

#### MAIN MARKETS:

- |                      |                                     |             |                                     |
|----------------------|-------------------------------------|-------------|-------------------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                                     |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/>            |
|                      |                                     | Buildtech   | <input type="checkbox"/>            |
|                      |                                     | Clothtech   | <input type="checkbox"/>            |
|                      |                                     | Geotextiles | <input type="checkbox"/>            |
|                      |                                     | Homotech    | <input type="checkbox"/>            |
|                      |                                     | Indutech    | <input type="checkbox"/>            |
|                      |                                     | Meditech    | <input checked="" type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/>            |
|                      |                                     | Oekotech    | <input type="checkbox"/>            |
|                      |                                     | Packtech    | <input type="checkbox"/>            |
|                      |                                     | Protech     | <input type="checkbox"/>            |
|                      |                                     | Sportech    | <input checked="" type="checkbox"/> |
| - Fashion / Apparel  | <input type="checkbox"/>            |             |                                     |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input checked="" type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making  | <input type="checkbox"/>            |
| - Knitting                    | <input checked="" type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input checked="" type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/> | - Distribution  | <input type="checkbox"/>            |
| - Coating                     | <input type="checkbox"/>            | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

The Thuasne Scan application, intended for pharmacists, enables exact measurements of the patient's legs to be obtained in order to provide the patient with the appropriate support socks or tights. The user takes two photos of the body which will be modelled in 3D, places four reference points on the tablet screen and launches the algorithm. In terms of equipment, a tablet and a tripod are all the user needs.

The aim is to offer customers the most suitable products for consumers by adapting to all bodies, but also to avoid physical contact when taking measurements and the inaccuracies of measuring with a tape measure.

## 3. WHAT?

On a daily basis, such a practice requires :

- A maintenance service for updating the application and resolving computer bugs,
- One or more people dedicated to customer relations in the event of user problems.
- One or more people in charge of updating product data in the ERP system.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

Initially, the company must be able to produce custom-made products (based on the scanned data) and within a short enough time frame to be competitive. For example, a small company may be able to do this if it manufactures partially - or totally - to order. This type of practice is more suited to companies offering finished or semi-finished products, as it involves scanning a model to offer suitable products.

At launch, this type of tool requires a lot of R&D investment (creation of the application, setting up the digital infrastructure, deployment on the media). The application can either be created internally or by an external service provider. Thuasne's application is interesting in that it requires little equipment: only a tripod and a tablet. These elements, not very bulky and expensive, can be mobilised by a very large majority of their customer network.

If the company does not have an online presence, the products and their characteristics can be collected and put online (on the ERP system). In this logic, it is important that the products offered are up to date: if one of them is no longer produced, or on the contrary, if production has just started, this information must be updated and accessible.

## 5. INTERNATIONAL

## 6. SOURCES

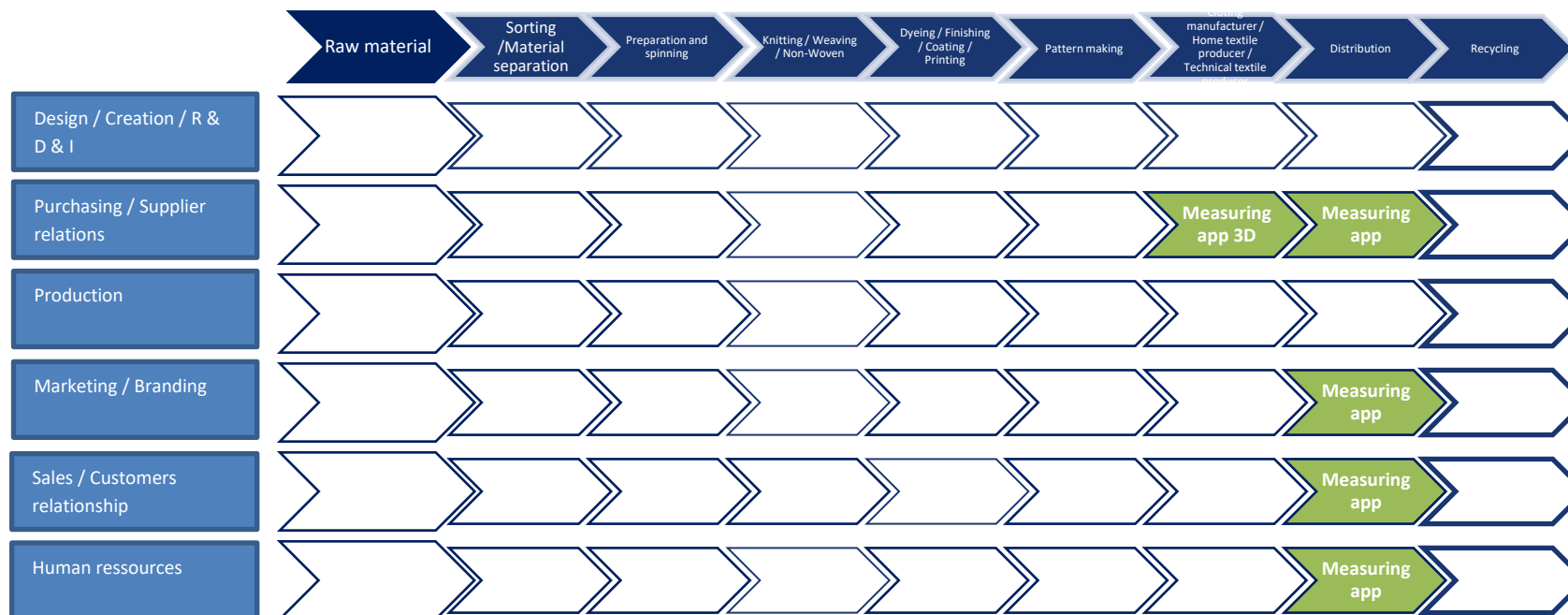
**Online newspaper :**

<https://www.usinenouvelle.com/article/thuasne-connecte-les-patients.N386690?pr=2>

<https://www.lesechos.fr/2017/01/thuasne-met-le-numerique-au-service-dun-corps-ameliore-152025>

**Internet website :** <https://fr.thuasne.com/fr/nos-services/thuasne-scan>

## CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing

## 3D DESIGN AND SIMULATION PLATFORM

### 1. WHICH?

Confetil S.A. (<http://www.confetil.pt/>) is a specialized on circular knit ready-made garments, working almost exclusively for international brands, with exports for countries such as Germany, Italy France, Spain, The Netherlands and Belgium, among others. Currently, the team consists of about 300 people, annual turnover of 40 million Euros, and a production capacity of approximately 400.000 pieces/month.

#### MAIN MARKETS:

- |                      |                                     |             |                                     |
|----------------------|-------------------------------------|-------------|-------------------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                                     |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/>            |
|                      |                                     | Buildtech   | <input type="checkbox"/>            |
|                      |                                     | Clothtech   | <input type="checkbox"/>            |
|                      |                                     | Geotextiles | <input type="checkbox"/>            |
|                      |                                     | Homotech    | <input type="checkbox"/>            |
|                      |                                     | Indutech    | <input type="checkbox"/>            |
|                      |                                     | Meditech    | <input checked="" type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/>            |
|                      |                                     | Oekotech    | <input type="checkbox"/>            |
|                      |                                     | Packtech    | <input type="checkbox"/>            |
|                      |                                     | Protech     | <input type="checkbox"/>            |
|                      |                                     | Sportech    | <input checked="" type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                                     |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input type="checkbox"/>            | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making  | <input checked="" type="checkbox"/> |
| - Knitting                    | <input checked="" type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input type="checkbox"/>            | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input type="checkbox"/>            | - Distribution  | <input type="checkbox"/>            |
| - Coating                     | <input type="checkbox"/>            | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

About two years ago, one customer of CONFETIL ask them to use CLO3D, a known system/platform for 3d design, to support the interaction between both parties, in the sampling stages. This as a departure from more traditional approaches of 1) modelling/design and 2) customer interaction. The ability to see a virtual 3d image of a garment opens a new field of opportunities for design, further more if we add simulation features. On top of that, the interaction between customer an producer, at the design and sampling stages of a prototype, can be enhanced in terms of time reduction and also the elimination of one or two interactions where there was already a need to produce and assess a physical instance of the garment.

Since that first customer, others have requested the same approach and the company has been investing little by little in this technology.

## 3. WHAT?

The ability to produce a virtual sample at the beginning of the sampling / prototype stage when discussing a new model with a customer brings several advantages. Today CONFETIL can begin the interaction between its customer and CONFETIL design teams based on a virtual prototype. With a first virtual prototype, both teams can discuss and agree on the main characteristics of the new garment, making changes to the design and even the nature of materials used. Taking advantage of the simulation feature offered by the design platform, one can change one material for another and see, dynamically, on that change affects the look and the fit of the new piece of garment. Just after these firsts interaction, the first set for physical garments is made.

CLO3D platform allows CONFETIL and its costumer share the same virtual product, so effectively collaborating on the same digital sample. In addition, CLO3D offers simulation features, allowing both CONFETIL and its customer to test and stress the digital prototype. 3D modelling is a significant improvement from the more traditional 2D views of garment

As a result of this transformation, training was given to the design and modelling team of CONFETIL, and a material library has been built. This database holds data about the nature of fabrics, data that includes information on the performance of the fabric, such as tensile properties. This database allows a quick interchange between two fabric options and observe the difference in real-time the difference between them. CONFETIL acquired some laboratory equipment in order to assess the performance of its fabrics. CLO3D is accessible by subscription.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

The technology that is at the centre of this digital transformation is 3D design and simulation. Garment are 3D objects that are essentially design from a 2D perspective only due to technical limitations of the tools used. However, the shift between 2D and 3D demands a shift in the way people think and view both the product and the process at the design/prototype stage. Until now, designers and modellers did not learn how to prototype directly into 3D. That is why actual design tools offer both views, 2D and 3D, at the same time. All this requires change that can only be effective with training, coaching and real context experiences.

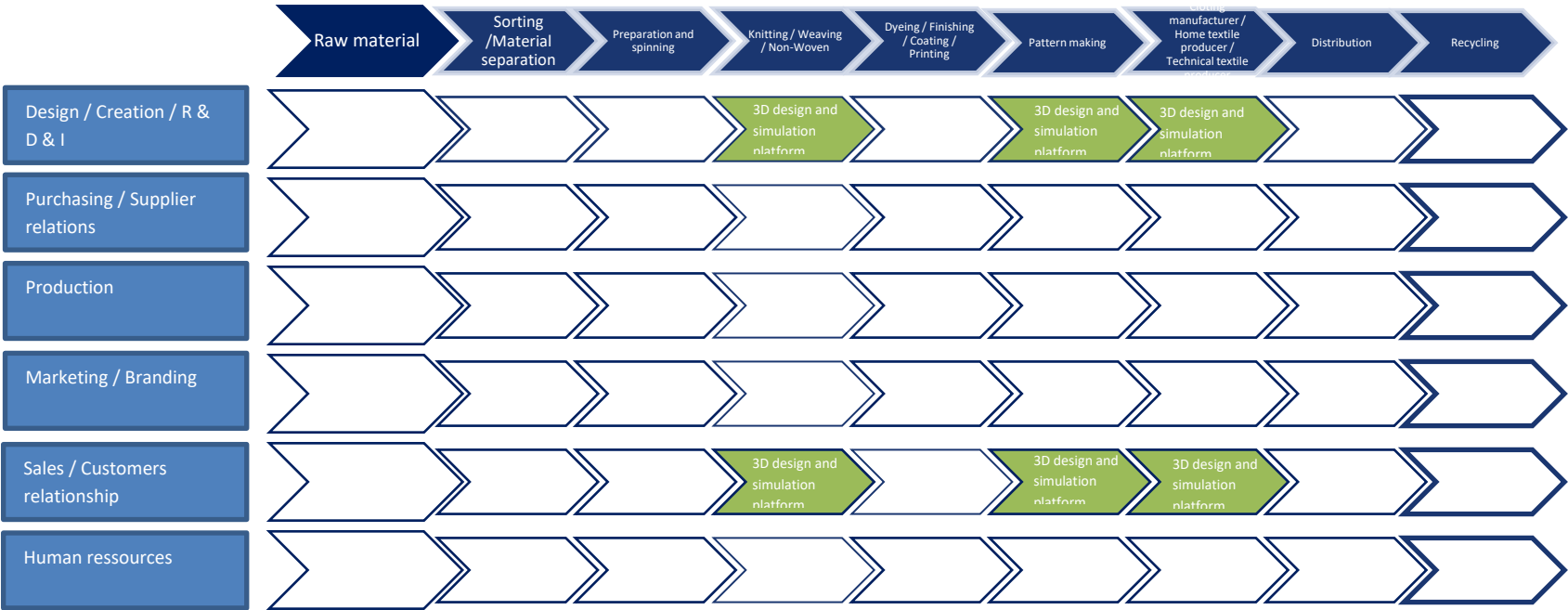
## 5. INTERNATIONAL

This new practices increased customer satisfaction mainly because it speeds up the early stages of prototyping, reduces the cost of producing samples (less samples are needed) and shorten the distance between teams from the customer and from CONTEFIL, because both are connected digitally and share the same information space.

## 6. SOURCES



CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing

## INTERACTIVE 3D PRODUCT CATALOG - AUGMENTED REALITY

### 1. WHICH?

TDV Industries is a French manufacturer of technical and functional textiles and fabrics for workwear, protective clothing and industrial applications.

#### MAIN MARKETS:

- |                      |                                     |             |                                     |
|----------------------|-------------------------------------|-------------|-------------------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                                     |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/>            |
|                      |                                     | Buildtech   | <input type="checkbox"/>            |
|                      |                                     | Clothtech   | <input type="checkbox"/>            |
|                      |                                     | Geotextiles | <input type="checkbox"/>            |
|                      |                                     | Homotech    | <input type="checkbox"/>            |
|                      |                                     | Indutech    | <input type="checkbox"/>            |
|                      |                                     | Meditech    | <input checked="" type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/>            |
|                      |                                     | Oekotech    | <input type="checkbox"/>            |
|                      |                                     | Packtech    | <input type="checkbox"/>            |
|                      |                                     | Protech     | <input checked="" type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/>            |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                                     |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input checked="" type="checkbox"/> | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input checked="" type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input checked="" type="checkbox"/> | - Pattern making  | <input type="checkbox"/>            |
| - Knitting                    | <input checked="" type="checkbox"/> | - Clothing manufacturer                                   | <input type="checkbox"/>            |
| - Weaving                     | <input type="checkbox"/>            | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              | <input checked="" type="checkbox"/> |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/> | - Distribution  | <input type="checkbox"/>            |
| - Coating                     | <input type="checkbox"/>            | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

The company has launched an augmented reality application, created to showcase a brand new colour range for customising professional clothing, via colours and/or specific colour combinations. The selected garments appear on a 3D model on the sales team's tablets, allowing customers to see the products in motion. The application allows dozens of colour combinations to be viewed very quickly.

This tool is intended to be a sales aid and to facilitate quick decisions when the choice is too large and to create a striking customer experience.

## 3. WHAT?

In terms of resources, this tool requires on a daily basis :

- One or more people in charge of updating the product catalogue (photos, descriptions, new colours, etc.),
- One or more people (internal or external), in charge of updating the application and correcting potential bugs,
- One or more people in charge of the 3D modelling of the products.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

This practice is more suitable for finished or semi-finished products, as it is based on projecting the product onto a moving 3D model.

At the launch, it is necessary to plan for :

- Time to create the architecture of the application, with deployment on the sales staff's tablets,
- A time for integrating the product database into the application or, in its absence, a fairly substantial time for compiling the information,
- 3D modelling time for the different ranges.
- Training the commercial team to use the app

## 5. INTERNATIONAL

If digitization includes an international value chain, what has been its impact on trade relations?

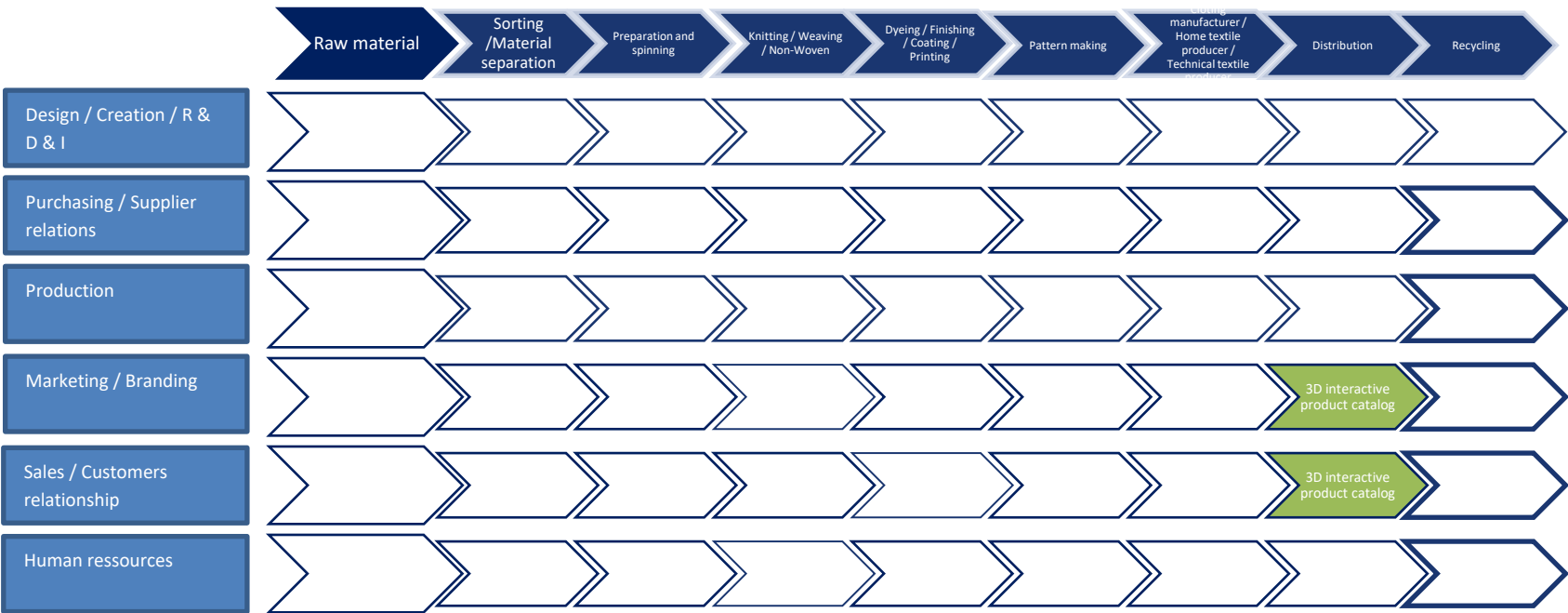
## 6. SOURCES

*Provide sources in which good practice has been identified (website, magazine, technical review, ...)*

**Online newspapers:**

<https://www.modeintextile.fr/interview-christophe-lambert-president-de-tdv-industries/>

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing

## VR AND AR FOR THE SALES AND IMPLEMENTATION OF MACHINES

### 1. WHICH?

Alliance Machines Textiles is a French company supplying machines for the textile industry, in particular for dyeing.

#### MAIN MARKETS:

- |                      |                                     |             |                                     |
|----------------------|-------------------------------------|-------------|-------------------------------------|
| - Home textiles      | <input checked="" type="checkbox"/> |             |                                     |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input checked="" type="checkbox"/> |
|                      |                                     | Buildtech   | <input checked="" type="checkbox"/> |
|                      |                                     | Clothtech   | <input checked="" type="checkbox"/> |
|                      |                                     | Geotextiles | <input checked="" type="checkbox"/> |
|                      |                                     | Homotech    | <input checked="" type="checkbox"/> |
|                      |                                     | Indutech    | <input checked="" type="checkbox"/> |
|                      |                                     | Meditech    | <input checked="" type="checkbox"/> |
|                      |                                     | Mobitech    | <input checked="" type="checkbox"/> |
|                      |                                     | Oekotech    | <input checked="" type="checkbox"/> |
|                      |                                     | Packtech    | <input checked="" type="checkbox"/> |
|                      |                                     | Protech     | <input checked="" type="checkbox"/> |
|                      |                                     | Sportech    | <input checked="" type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                                     |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                          |
|-------------------------------|-------------------------------------|---|--------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing                          | <input type="checkbox"/> |
| - Preparation and Spinning    | <input type="checkbox"/>            | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/> |
| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making  | <input type="checkbox"/> |
| - Knitting                    | <input type="checkbox"/>            | - Clothing manufacturer                                   | <input type="checkbox"/> |
| - Weaving                     | <input type="checkbox"/>            | - Home textile producer                                   | <input type="checkbox"/> |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                          |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/> | - Distribution  | <input type="checkbox"/> |
| - Coating                     | <input checked="" type="checkbox"/> | - Recycling   | <input type="checkbox"/> |

## 2. WHY?

Alliance Machines Textiles uses a Virtual Reality (VR) and Augmented Reality (AR) solution to digitally present its textile machines.

The main objectives are:

- To engage the customer via an original product presentation
- To be able to present its product catalogue in a fully digital form and thus facilitate the marketing process, either by working remotely or by travelling with minimal equipment to increase the number of possible sales actions
- To develop the image of an innovative company
- To enable the customer to better plan his purchase and facilitate the final integration into the production tool

## 3. WHAT?

In practice, representatives of Alliance Machines Textiles can present their catalogue of machines modelled in 3D, either on a screen (smartphone, computer) or in a VR headset (Oculus). Instead of having to move a machine or its components, a computer and a VR headset (or a smartphone with the relevant app) are therefore sufficient.

It is possible to set up the application to show specific machines, choose which machine to show from a range of possibilities (the choice is taken within the application), view them in the virtual environment created in the software suite, move around the machine to see its size and operational functioning in order to anticipate the future implementation. Some machine animations are available; it is also possible to “go inside” the machines.

The machines are customizable, but the choice of components and elements must be performed upstream, as it cannot be done directly when the customer is inside the visualization space of the app.

It is also possible to have several users in the application at the same time, which makes it possible to carry out a real digital tour of the catalogue, even remotely.

An augmented reality (AR) function has also been developed. For example, via smartphone at a trade fair: on the smartphone's screen will be displayed the trade fair environment with its aisles and stands, and in addition the machine will be displayed, which again makes it possible to view and have it in front of the client without having to install and transport it. The advantage is also to be able to visualize the machine within the existing production tool, in the customer's factory.

Video illustration is available here: [https://www.linkedin.com/posts/alliance-machines-textiles\\_alliance-machines-textiles-votre-projet-activity-670977048548119744-G4sK/](https://www.linkedin.com/posts/alliance-machines-textiles_alliance-machines-textiles-votre-projet-activity-670977048548119744-G4sK/)

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

The main technology required is a software solution developed by a service provider to integrate the 3D models of the different machines and components of Alliance Machines Textiles. The service provider then creates a virtual environment to present the products within it.

On the user's side, it is necessary to have an application provided by the service provider and shared by Alliance Machines Textiles, which allows the products to be displayed on different screen supports, including a VR headset (currently, only the Oculus is supported). The aim is for sales agents to eventually have an VR headset that they can make their customers use.

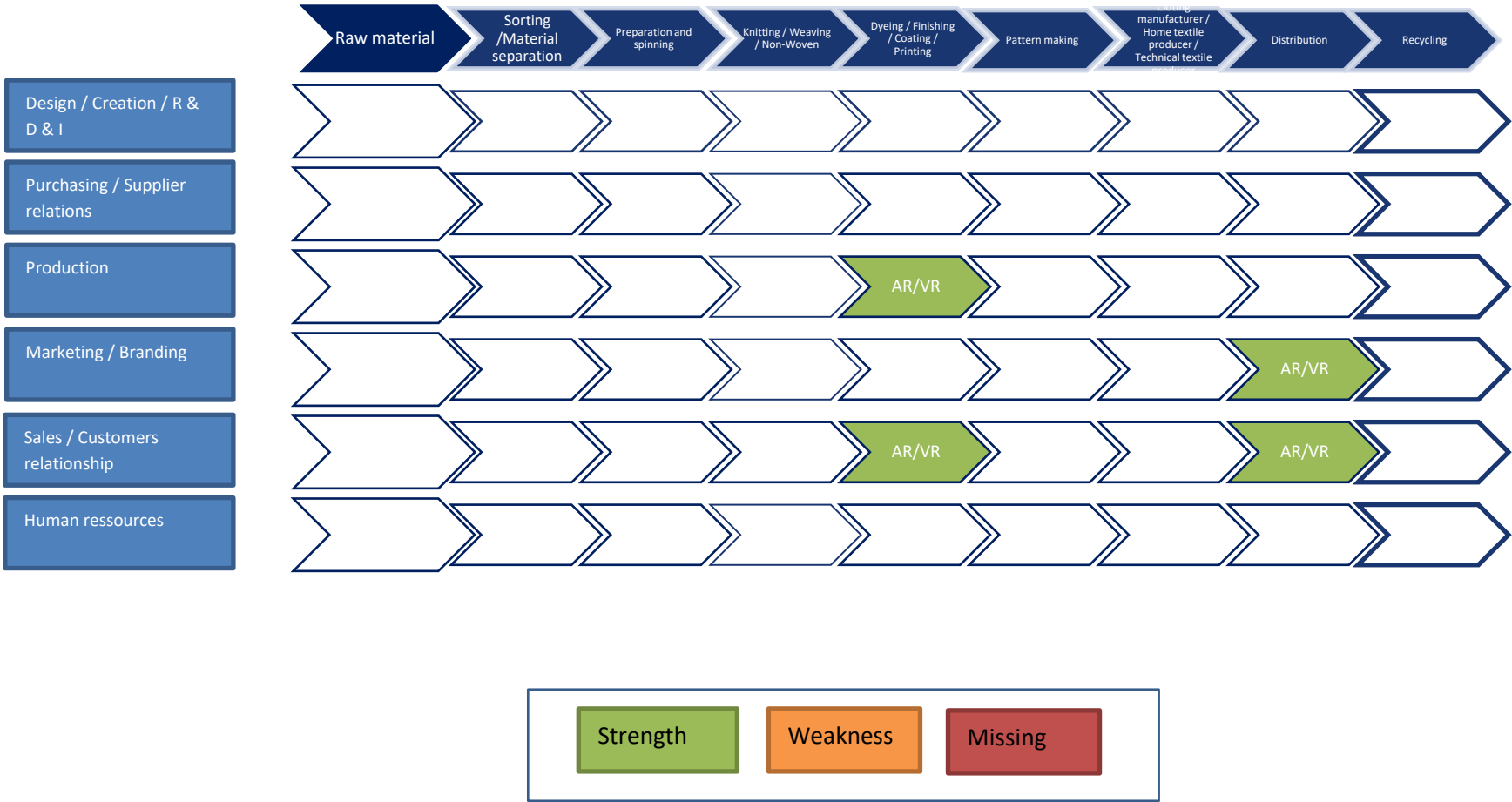
## 5. INTERNATIONAL

This solution facilitates the process of marketing and selling textile machines, as it is possible to visualize them in 3D and within an environment without having to move/install them, and without having to be limited with a paper catalogue. At an international level, this therefore increases the potential for prospecting and commercial actions, and improves customer follow-up during the machine installation phase.

## 6. SOURCES

Interview conducted with M. David Godinaud, CEO, Alliance Machines Textiles.

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE





## TRACEABILITY - BLOCKCHAIN

### 1. WHICH?

*Tilkal* is a French brand based in Paris and specialized in the blockchain science. They use this technology and data intelligence to improve the traceability and the transparency of supply chains.

Lenzing will use the technology to ensure transparency and traceability for both brands and consumers of its fibers in finished garments. It will join the TextileGenesis platform to accomplish this. TextileGenesis™ is a pioneering traceability platform custom built for the apparel ecosystem.

### MAIN MARKETS:

- |                      |                          |             |                          |
|----------------------|--------------------------|-------------|--------------------------|
| - Home textiles      | <input type="checkbox"/> |             |                          |
| - Technical textiles | <input type="checkbox"/> | Agrotech    | <input type="checkbox"/> |
|                      |                          | Buildtech   | <input type="checkbox"/> |
|                      |                          | Clothtech   | <input type="checkbox"/> |
|                      |                          | Geotextiles | <input type="checkbox"/> |
|                      |                          | Homotech    | <input type="checkbox"/> |
|                      |                          | Indutech    | <input type="checkbox"/> |
|                      |                          | Meditech    | <input type="checkbox"/> |
|                      |                          | Mobitech    | <input type="checkbox"/> |
|                      |                          | Packtech    | <input type="checkbox"/> |
|                      |                          | Protech     | <input type="checkbox"/> |
|                      |                          | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input type="checkbox"/> |             |                          |

### TEXTILE VALUE CHAIN:

- |                               |                                       |   |                                     |
|-------------------------------|---------------------------------------|---|-------------------------------------|
| - Raw material                | <input checked="" type="checkbox"/>   | - Printing / Silkscreen printing / digital printing       | <input checked="" type="checkbox"/> |
| - Preparation and Spinning    | <input type="checkbox"/> X            | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/>              | - Pattern making / Cutting / Sewing                       | <input checked="" type="checkbox"/> |
| - Knitting                    | <input checked="" type="checkbox"/>   | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input checked="" type="checkbox"/> X | - Home textile producer                                   | <input checked="" type="checkbox"/> |
| - Non-woven                   | <input checked="" type="checkbox"/>   | - Technical textile producer                              | <input checked="" type="checkbox"/> |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/>   | - Quality control (fabric / garment inspection)           | <input checked="" type="checkbox"/> |
| - Coating / laminating        | <input type="checkbox"/>              | - Distribution  | <input checked="" type="checkbox"/> |
|                               |                                       | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

The blockchain technology creates a network that can be accessed by many intermediaries, who can share secure information collected in blocks, linked to each other. All the information added in one of this units, instantly appears in the other unit, and in case that any of the intermediaries wants to modify the information, all the other actors must approve this change. This process allows all the actors and stakeholders of the supply chain to have access to past information and proof the origin and modifications of the product concerned.

## 3. WHAT?

The goal is that all the actors share the information as soon as the product moves forward in the supply chain. That is to say that every person that is in contact with the product concerned, must register her/his interaction. If we work under the assumption of the value chain of a colorant, the employees in the laboratory will document the composition of this chemical product and upload it in the first block of the blockchain; after that, the distributor will follow the same procedure when picking up and transporting the colorant; once the warehouse has received the product, they will also document its interaction. And this exact same method is the one that all the other intermediaries will execute as soon as they interact with the product.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

It is crucial that all the intermediaries implement the software needed to register their interaction with the product, together with an Internet access and an extended formation on how to use the platform.

## 5. INTERNATIONAL

It allows establishing relationships with international customers and consumers with high transparency and product monitoring in all the steps of its manufacturing.  
Knowledge of the origin and manufacture of the product that is being bought or consumed.

## TRACEABILITY - BLOCKCHAIN

### 1. WHICH?

Lenzing, ARMEDANGELS and Schneider – joined hands with TextileGenesis™ to create an unprecedented level of traceability. The fiber-to-retail traceability pilots covered 45 garment styles each containing EcoVero™ viscose fibers or AUTHENTICO® organic wool. Textile Genesis is a blockchain-enabled digital transparency platform for the apparel supply chain. Textil Santanderina is one of Lenzing™ exclusive partners in the EcoVero™ distribution chain. This cooperation constitutes a guarantee of quality, traceability and transparency. Santanderina Group is a yarn and fabric producer offering Lenzing Ecovero Fibers, which has been working in the textile industry since 1923.

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input checked="" type="checkbox"/> |             |                          |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input checked="" type="checkbox"/> | - Printing / Silkscreen printing / digital printing       | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input checked="" type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input checked="" type="checkbox"/> | - Pattern making / Cutting / Sewing                       | <input type="checkbox"/>            |
| - Knitting                    | <input checked="" type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input checked="" type="checkbox"/> | - Home textile producer                                   | <input checked="" type="checkbox"/> |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              | <input type="checkbox"/>            |
| - Dyeing / Finishing          | <input type="checkbox"/>            | - Quality control (fabric / garment inspection)           | <input type="checkbox"/>            |
| - Coating / laminating        | <input type="checkbox"/>            | - Distribution  | <input checked="" type="checkbox"/> |
|                               |                                     | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

Using the innovative Fibercoin™ technology of the TextileGenesis™ platform were able to issue digital blockchain ‘assets’ (or tokens) in direct proportion to the physical shipments of EcoVero™ and Authentico® fibers. These digital tokens provide a unique ‘fingerprint’ and authentication mechanism, preventing adulteration and providing a secure, digital chain-of-custody across the entire textile value chain.

TextileGenesis™ platform is an outcome of intensive “grass-root” discussions with the entire apparel supply chain from fiber producers, fabric mills, dyeing house, cut & sew, to retail brands. The platform provides a true global language for supply chain tracking

Our platform allows digitization and traceability of any textile asset such as fiber, yarn, fabric, or garment through fibercoins™ (patent pending). Any sustainable textile player can issue fibercoins™ directly linked to his textile asset.

fibercoins™ create the ability to transparently trace & manage the textile products across the apparel supply chain. They created the first fiber-to-retail traceability data standard for the apparel ecosystem based on GS1 framework.

Using the innovative Fibercoin™ technology of the TextileGenesis™ platform, Lenzing, ArmedAngels, and Schneider were able to issue digital blockchain ‘assets’ (or tokens) in direct proportion to the physical shipments of LENZING™ ECOVERO™ and Authentico® fibers. These digital tokens provide a unique ‘fingerprint’ and authentication mechanism, preventing adulteration and providing a secure, digital chain-of-custody across the entire textile value chain. Leading industry brands and retailers are teaming up with Lenzing and are using Lenzing EcoVero fibres in their collections to improve transparency and traceability, two critical components of a verifiable sustainability strategy that is in line with the demands of today's market.

Up to 30% of branded ingredients such as organic or sustainable fibers are estimated to be fake

Textile companies that purchased other common viscose cannot know the origins from the raw material of the viscoses. By contrast with Ecovero you know the wood comes from sustainable forestry plantations this ensure that the most sustainable wood sources are used for viscose production.

Lenzing EcoVero fibres, Lenzing launches unique environmentally friendly and traceable viscose fibres. A special manufacturing system enables Lenzing to identify Lenzing EcoVero fibres in the final product, long after the textile processing and conversion steps have been completed. This ability to easily verify the original fibres means that retailers and brands can be sure that they are indeed incorporating Lenzing's eco-responsible viscose fibres, and not just any generic viscose that might not be in line with their sustainability goals.

Ecovero offers a fiber with sustainability guarantees endorsed by FSC or PEFC certifications and an ecological production process with lower emissions and water impacts than conventional viscose.

## 3. WHAT?

The new identification technology from Lenzing which is used by Ecovero fibers allows to have full supply chain transparency and it assure us having the same quality of visco fiber material in all the chain textile processes from the beginning to the end with the sale of the garment.

#### 4. HOW? TECHNOLOGIES / ORGANIZATIONS

#### 5. INTERNATIONAL

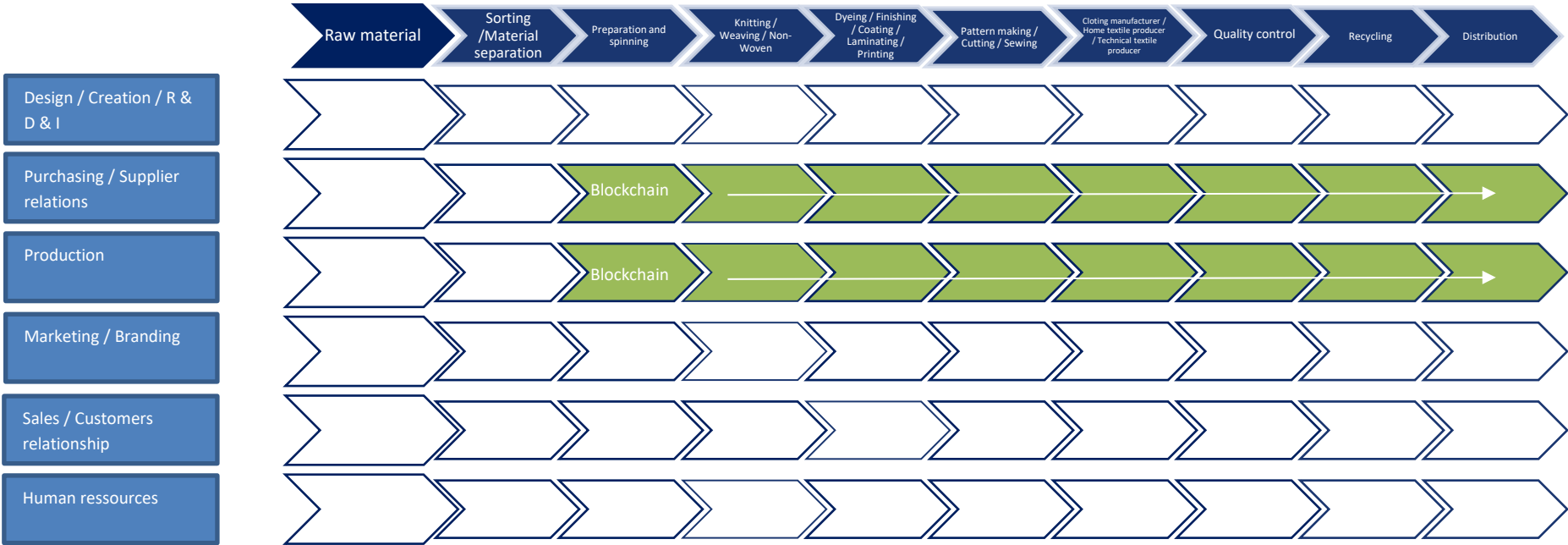
Consumers today expect responsible retailers and brands to know their supply chains and to be able to trace product origins.

Allowing brands to identify the use of Lenzing EcoVero fibres in the final product is adding an increased level of trust in the supply chain, thus ensuring full traceability. As a radically responsible fashion brand this is a great match for the fashions to be working with Lenzing to include EcoVero in our future product range

A special manufacturing system allows LENZING™ ECOVERO™ viscous fibers to be identified in the final product, even after a lengthy process and conversions through the value chain. Environmentally conscious consumers can be assured that retailers and brands include genuine and environmentally responsible LENZING™ ECOVERO™ viscose in their products. To made garments using the Ecovero fiber assure to the final costumers they are certified with the internationally recognized EU eco-label. This label of environmental excellence is only awarded to products and services that have a significantly low impact on the environment during their life cycle: from raw material extraction to production, distribution and disposal.

LENZING™ ECOVERO™ and the supply chain traceability on TextileGenesis™ creates the industry's most comprehensive fiber assurance mechanism - brands can be fully sure they actually receive when they pay for Lenzing's sustainable fibers.

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



## SORTING POST-CONSUMER CLOTHING – NIR VISION

### 1. WHICH?

Fibersort™ by Valtech (©VALVAN BALING SYSTEMS NV) is Belgium company that offers automatization, software and scanner (near infrared range) to textile recycling of post-consumer textiles.

JOSE FUSTER, S.L. [www.fuster.com](http://www.fuster.com) Is the exclusive Agent for the Spanish market of the world's leading manufacturers of machinery, equipment and accessories for the textile industry and of the Fibersort System/technology.

Fibersort™ technology has implemented in the first pilot plant in Holland in Wieland company [www.wieland.nl/en/](http://www.wieland.nl/en/)

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input checked="" type="checkbox"/> |             |                          |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input checked="" type="checkbox"/> | - Printing / Silkscreen printing / digital printing       | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input type="checkbox"/>            | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input checked="" type="checkbox"/> | - Pattern making / Cutting / Sewing                       | <input type="checkbox"/>            |
| - Knitting                    | <input type="checkbox"/>            | - Clothing manufacturer                                   | <input type="checkbox"/>            |
| - Weaving                     | <input type="checkbox"/>            | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              | <input type="checkbox"/>            |
| - Dyeing / Finishing          | <input type="checkbox"/>            | - Quality control (fabric / garment inspection)           | <input type="checkbox"/>            |
| - Coating / laminating        | <input type="checkbox"/>            | - Distribution  | <input type="checkbox"/>            |
|                               |                                     | - Recycling   | <input checked="" type="checkbox"/> |

## 2. WHY?

Fibersort™ The Fibersort is a technology that automatically sorts large volumes of mixed post-consumer textiles by fibre type. Once sorted, these materials become reliable, consistent input materials for high-value textile to textile recyclers. Fibersort scans and sorts garments into uniform categories of fibers with specified compositions, colours and structures.

The technology works with a software and a NIR Spectofotometer to detect the kind of material

Fibersort can sort on fiber + color at one piece/second

A high-tech detection unit together with smart algorithms combines the information of multiple sensors to classify textiles based on your needs. The Fibersort™ can now sort all textiles based on following properties in as many categories as you desire:

- Fiber composition: natural fiber, synthetic or blends fiber ( 100% linen, 100%Pes, 70%Pes -30% Cotton)
- Color : dark vs light colors (color scanner on the same system)
- Additionally a robot system can automatically feed the fibersort.

More reliable classification by typology of fiber: The classification by composition, the staff had to see the information in the garments composition labels and in some cases, such as scraps, they did not have any information about it.

## 3. WHAT?

Manual inspection of textiles belongs to the past. The sorting process based on material properties is now fully automatic. More hygienic process for the staff that has to handle the garments

This system allow to the company to work without having to the staff to picking up garments one by one and it is also it is not necessary to have staff sorting and select the waste manually.

There are 2 option: to implement the full system with automatic robots and solenoid valves to sort garments by material or to work only with a central software and several optical scanners on different workstations and the staff will do the manual sorting.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

You can implement the software and the scanner or the software, the scanner and the automatization systems for the pick-up of the pieces and the classification buckets.

The system is very easy and you only need to introduce the filters or items you want to make the selection of post-consume textiles in the software.

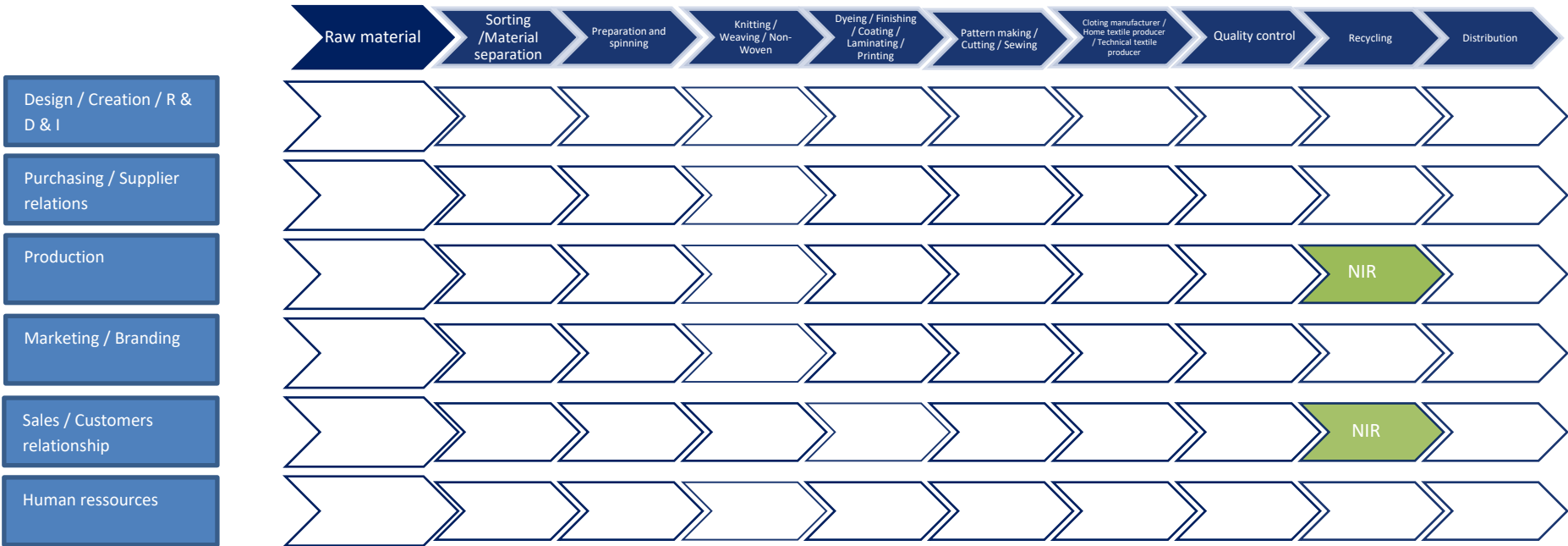
Technical staff with the training can manage to the fibersort system.

## 5. INTERNATIONAL

You can quickly detect with the scanner the content by material of the textile bales that come from international clients. Confidence with the client. There are no human errors due to the classification and separation of textile waste and correct delivery of the selection of the textile product.



CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



## PHYGITAL SHOPS

### 1. WHICH?

Nike is a large international group specialising in the design and distribution of sporting goods (footwear, clothing and equipment).

#### MAIN MARKETS:

- |                      |                                     |             |                                     |
|----------------------|-------------------------------------|-------------|-------------------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                                     |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/>            |
|                      |                                     | Buildtech   | <input type="checkbox"/>            |
|                      |                                     | Clothtech   | <input type="checkbox"/>            |
|                      |                                     | Geotextiles | <input type="checkbox"/>            |
|                      |                                     | Hometech    | <input type="checkbox"/>            |
|                      |                                     | Indutech    | <input type="checkbox"/>            |
|                      |                                     | Meditech    | <input type="checkbox"/>            |
|                      |                                     | Mobitech    | <input type="checkbox"/>            |
|                      |                                     | Oekotech    | <input type="checkbox"/>            |
|                      |                                     | Packtech    | <input type="checkbox"/>            |
|                      |                                     | Protech     | <input type="checkbox"/>            |
|                      |                                     | Sportech    | <input checked="" type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                                     |

#### TEXTILE VALUE CHAIN:

- |                               |                          |   |                                     |
|-------------------------------|--------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/> | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/> | - Pattern making  | <input type="checkbox"/>            |
| - Knitting                    | <input type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/> | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input type="checkbox"/> | - Distribution  | <input checked="" type="checkbox"/> |
| - Coating                     | <input type="checkbox"/> | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

Phygital shops aim to offer a more personalised customer experience.

In the case of Nike, in the shop on the Champs Elysées (Paris), the customer downloads the dedicated application when entering the shop, and through this, can order shoes, book a booth, receive recommendations. The shoes will already be prepared in the collection points, the outfits in the fitting room.

A scanning system is also used to measure the size and shape of the customer's feet (Nike fit) in order to give appropriate recommendations. The same applies to bras and brassieres: the customer indicates her measurements and sports activities and receives a list of suitable products. The number of fittings is therefore limited.

This fusion between digital and physical allows the customer to continue the customer journey which could have been stopped at the digital stage (of the online shopping cart never validated). It also makes it possible to capture customers who are reluctant to buy shoes or sportswear exclusively online. In today's sanitary conditions, these concept stores make it possible to avoid contact and maintain social distancing (reduced queues, less contact on products).

## 3. WHAT?

Product data must be recorded and updated in an ERP system, with a large number of product details (dimensions and associated size, type of sport, colour, etc.). Stocks must also be constantly updated and linked to the ERP, also linked to the application, in order to be able to offer products in stock.

In terms of human resources, must be mobilised,

- A team dedicated to managing the shop's stock,
- A team dedicated to recording product data,
- A team dedicated to making products available to customers,
- A team of computer technicians (possible problems with the application, scan tiles for the feet...).

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

This practice implies significant budgets in terms of marketing (promotion of the concept store, product characterisation and creation of filters to sort the products) and R&D (development of the different scanning devices, the adapted application). It is therefore more suitable for designers/distributors already engaged in a digitalisation process.

At the launch, an investment in land is potentially to be considered in order to accommodate the concept store, as well as scenography costs.

In order to limit costs, a click and collect system can be considered, which is similar to Phygital shops but offers a less extended and striking customer experience: customers and consumers buy online, and come to collect their products in the shops.

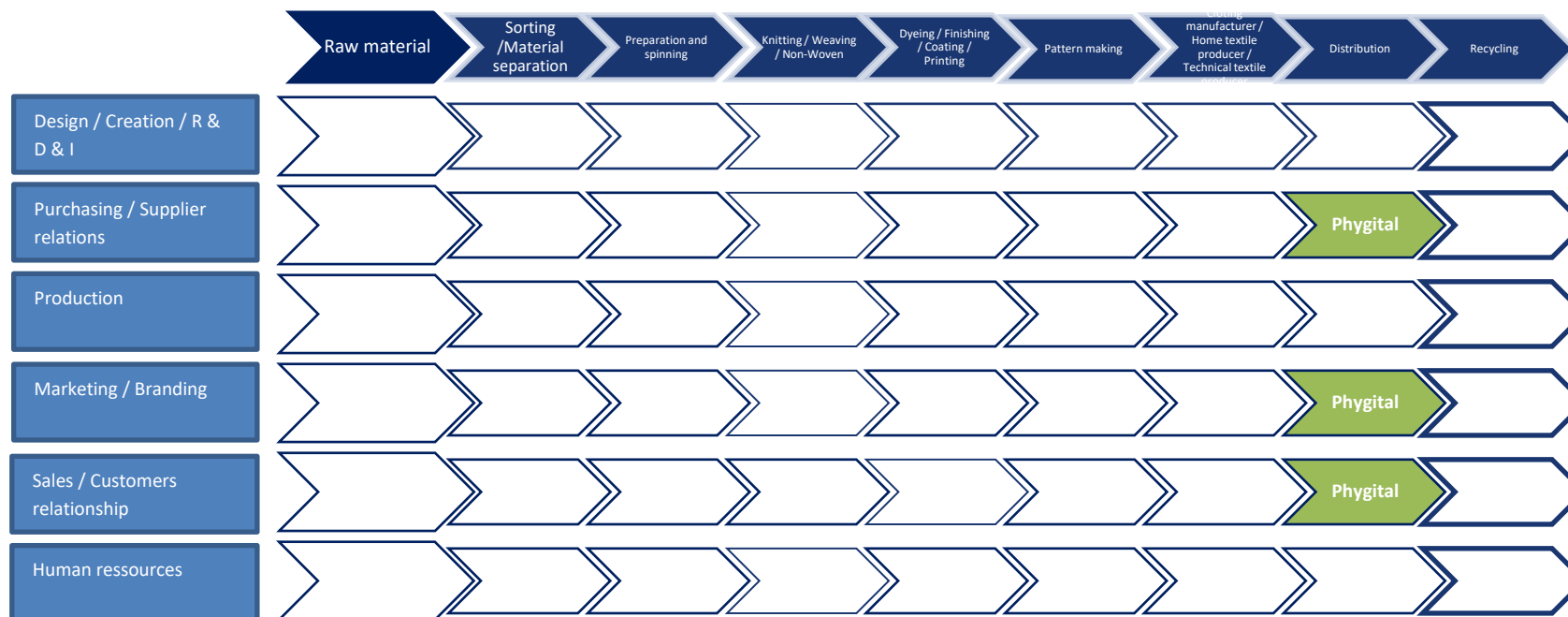
## 5. INTERNATIONAL

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## 6. SOURCES

**Online newspapers:** <https://www.lesechos.fr/industrie-services/mode-luxe/nike-soffre-les-champs-elysees-pour-son-magasin-du-futur-1227175>  
<https://www.usine-digitale.fr/article/le-nouveau-concept-store-digitalise-de-nike-a-ouvert-ses-portes.N720909>  
**Webistes:** <https://www.nike.com/fr/house-of-innovation>

## CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing

## PRODUCT CATALOGUE APPLICATION

### 1. WHICH?

Thuasne is a French group that designs, develops and manufactures medical devices, mainly orthoses. The group's expertise mainly covers the fields of orthopaedics, medical compression and home support.

#### MAIN MARKETS:

- |                      |                                     |             |                                     |
|----------------------|-------------------------------------|-------------|-------------------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                                     |
| - Technical textiles | <input checked="" type="checkbox"/> | Agrotech    | <input type="checkbox"/>            |
|                      |                                     | Buildtech   | <input type="checkbox"/>            |
|                      |                                     | Clothtech   | <input type="checkbox"/>            |
|                      |                                     | Geotextiles | <input type="checkbox"/>            |
|                      |                                     | Homotech    | <input type="checkbox"/>            |
|                      |                                     | Indutech    | <input type="checkbox"/>            |
|                      |                                     | Meditech    | <input checked="" type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/>            |
|                      |                                     | Oekotech    | <input type="checkbox"/>            |
|                      |                                     | Packtech    | <input type="checkbox"/>            |
|                      |                                     | Protech     | <input type="checkbox"/>            |
|                      |                                     | Sportech    | <input checked="" type="checkbox"/> |
| - Fashion / Apparel  | <input type="checkbox"/>            |             |                                     |

#### TEXTILE VALUE CHAIN:

- |                               |                                     |   |                                     |
|-------------------------------|-------------------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/>            | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input checked="" type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/>            | - Pattern making  | <input type="checkbox"/>            |
| - Knitting                    | <input checked="" type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input checked="" type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/>            | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input checked="" type="checkbox"/> | - Distribution  | <input type="checkbox"/>            |
| - Coating                     | <input type="checkbox"/>            | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

The Thuasne Care application is intended for health professionals: pharmacists (50%), doctors, physiotherapists, nurses... This tool, available under Android and iOS, lists the 8,000 product references according to the pathologies and morphology of the patient.

The objective is to offer customers rapid access to the Thuasne products catalogue, with targeted searches, and thus to build customer loyalty in order to make the customer (the health professional) a prescriber to patients faced with competing offers. This tool also makes it possible to show that the company has a wide range of products, easily identifiable and which will be adapted to the needs of the patient and the pharmacist.

## 3. WHAT?

On a daily basis, such a tool requires :

- A maintenance service for updating the application and resolving computer bugs,
- One or more people dedicated to customer relations in the event of a problem of use,
- A regular update of the product catalogue and references (additions as well as removals).

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

This practice can be established in any textile company and any sector of activity (technical, fashion, furnishing) as long as it has a product or process catalogue.

At launch, this type of tool requires a lot of development investment (creation of the application, setting up the digital infrastructure, deployment on the media). The application can either be created internally or by an external service provider. The application is all the more interesting and easy to deploy as it requires equipment that is owned by everyone: a smartphone (Android or iOS). These elements, which take up little space and are expensive, can be mobilised by the vast majority of their customer network.

If the company does not already have an online presence, the products and their characteristics can be collected and put online (on the ERP). In this logic, it is important that the products offered are up to date: if one of them is no longer produced, or on the contrary, if production has just started, this information must be updated and accessible.

## 5. INTERNATIONAL

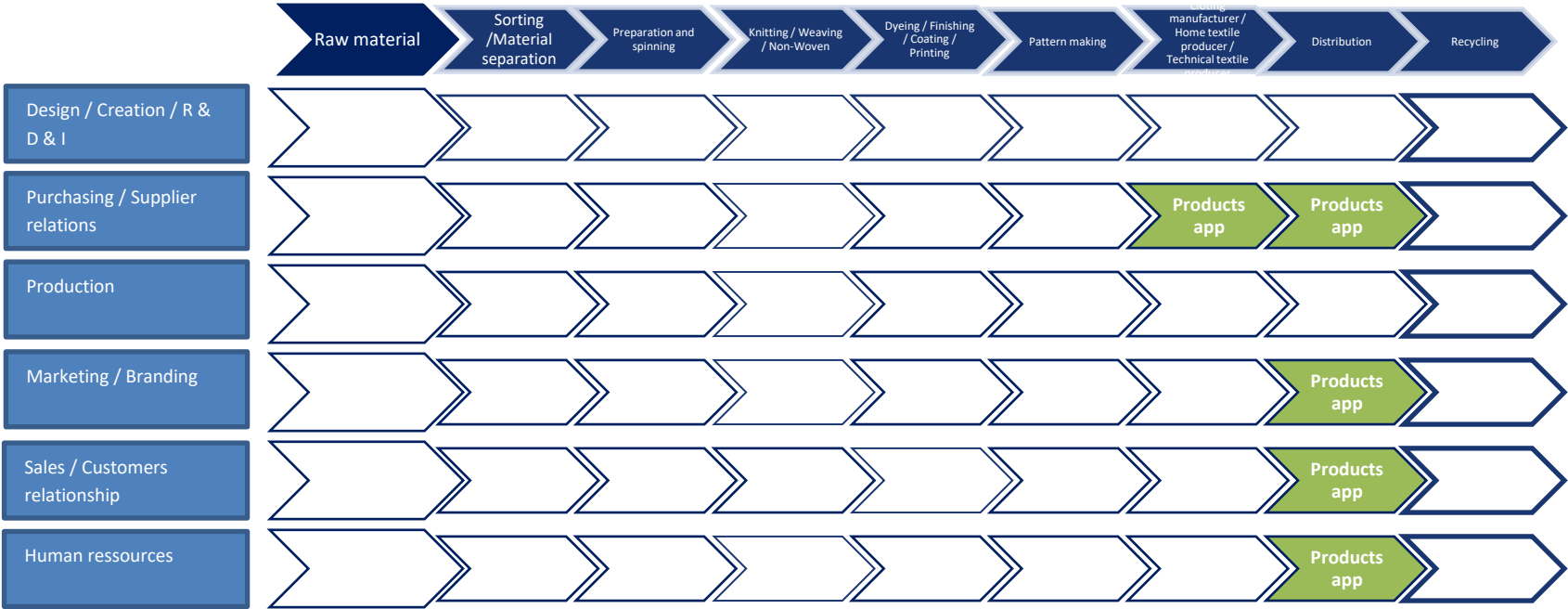
## 6. SOURCES

Online newspaper:

<https://www.usinenouvelle.com/article/thuasne-connecte-les-patients.N386690?pr=2>

Website: <https://fr.thuasne.com/fr/nos-services/thuasne-care>

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing



## PLATFORM FOR BRAND MANAGEMENT AND DISTRIBUTION PARTNERS MANAGEMENT

### 1. WHICH?

Betty Barclay is a German women's clothing production and sales company belonging to the Winter Holding GmbH & Co. KG group.  
Fashion Cloud is a German digital platform provider (PaaS, platform as a service), linking fashion brands and retailers.

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Hometech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Oekotech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

#### TEXTILE VALUE CHAIN:

- |                               |                          |   |                                     |
|-------------------------------|--------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/> | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/> | - Pattern making  | <input type="checkbox"/>            |
| - Knitting                    | <input type="checkbox"/> | - Clothing manufacturer                                   | <input type="checkbox"/>            |
| - Weaving                     | <input type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/> | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input type="checkbox"/> | - Distribution  | <input checked="" type="checkbox"/> |
| - Coating                     | <input type="checkbox"/> | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

Betty Barclay uses a Fashion Cloud platform from which the group chooses all the digital content it wishes to associate with its 8 brands (photographs, videos, descriptive texts). This B2B PaaS operates in an intranet format, similar to that of a marketplace, with access rights managed independently for each brand and retailer. Authorised resellers also have access to the content, free of charge, to be better informed about the products in real time (1,000 resellers in 25 countries).

The aim is to pool marketing data in a single place, to facilitate distribution to resellers and to save costs on in-house management software, with different tools for each one. Betty Barclay ensures a better follow-up from its resellers, and the latter benefit from a better transmission of information. The different ERP systems of the resellers can be connected to the platform, without any additional handling for data transmission. Betty Barclay can use this system to carry out a centralized brand management to manage its distribution.

## 3. WHAT?

On a daily basis, the use of this tool requires:

- Sales and distributor relations (sales) teams aware of the importance of distributing product information via intranet
- A well-established brand management
- A communication team in charge of disseminating information on the platform (creation of visuals, integration of information into a database, data verification, etc.), thus a well-established and responsive content management system
- A team in charge of the technical maintenance of the IT tool
- A team in charge of user problems so that resellers can benefit from the tool without any problems
- A team in charge of processing usage reporting by resellers

Betty Barclay pays a subscription to Fashion Cloud to set up and maintain this platform.

#### 4. HOW? TECHNOLOGIES / ORGANIZATIONS

At the launch, a company must forecast:

- The cost of integrating existing data, as well as the structuring of the platform (database management and content management).
- Information and training time for authorized resellers and teams in charge of updating and maintaining the platform.
- An operational data and confidentiality management system
- An adapted brand management policy

The technological part is managed by the service provider, the administration of the platform by the user (here, Betty Barclay, with personalised access rights for resellers). The platform uses the following technologies:

- Pol (Point of Interest) Data Provider: visibility retail points on a map
- BigData Analysis: processing of brand and reseller data for reporting and benchmarking purposes
- Cloud storage, for online hosting and live platform updates
- Objects storage (images)

The platform can be used via various interfaces: application, ERP integration, website.

#### 5. INTERNATIONAL

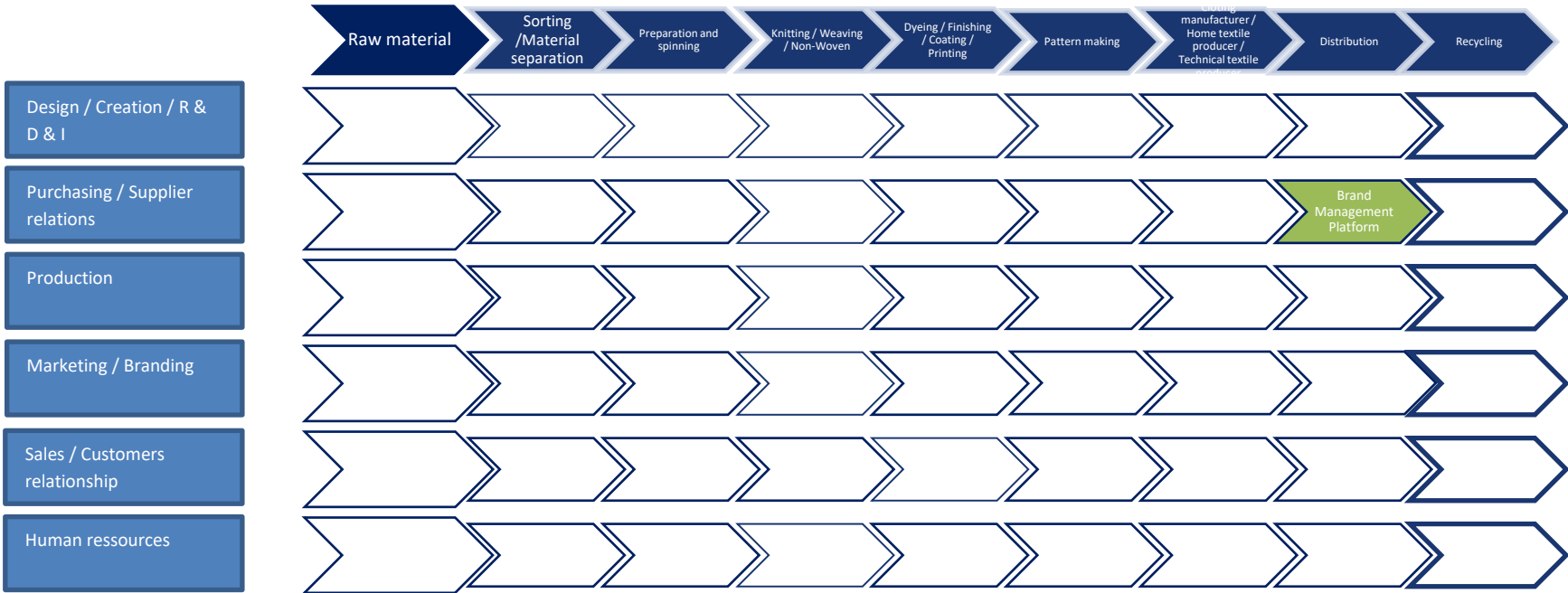
On an international scale, this system allows the central data management of Betty Barclay's various brands to optimize the transmission of information and data to retailers, wherever they are. The tool simplifies this relationship and makes it faster and more efficient, allowing Betty Barclay to manage its distributor relations anywhere in the world using a single platform and to conduct a centralized brand management policy.

#### 6. SOURCES

<https://fashion.cloud/en/betty-barclay-experience-fashion-cloud>

<https://www.fiware.org/success-stories/fashion-cloud/>

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE



Strength

Weakness

Missing

## PRODUCTION ON DEMAND VIA COMMUNITY MANAGEMENT

### 1. WHICH?

Asphalte is a French brand of men's ready-to-wear clothing, produced on demand and sold online.

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Oekotech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

#### TEXTILE VALUE CHAIN:

- |                               |                          |   |                                     |
|-------------------------------|--------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/> | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/> | - Pattern making  | <input type="checkbox"/>            |
| - Knitting                    | <input type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/> | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input type="checkbox"/> | - Distribution  | <input checked="" type="checkbox"/> |
| - Coating                     | <input type="checkbox"/> | - Recycling   | <input type="checkbox"/>            |

## 2. WHY?

Asphalte aims to offer high quality, durable and aesthetic products at a competitive price. To achieve this objective, the company produces on demand, while keeping its products affordable for the ready-to-wear market. It is in fact an "almost on-demand" production: the community makes its demands on different aspects of the upcoming collection, but not on the detail of each garment.

Added value: a more sustainable production (no unsold items and limited quantities), meeting the expectations of the brand community (customer satisfaction), for an excellent quality/price ratio while following-up with customer returns (loyalty), and with a reduction in production costs (no stocks or unsold items).

## 3. WHAT?

The process used by Asphalte is the following:

1. Sending to the consumer community (i.e. the purchasers of Asphalt products) a survey in the form of a digital questionnaire in order to determine the needs and desires of this community for future products (textures, uses, shapes, colours, etc.).
2. Analysis of the results of the survey and development of products for the next collection, including laboratory tests
3. Photo shooting with the prototypes for the creation of the online catalogue, on the Asphalte website
4. Sale of the collection on the Asphalte website for up to 30 days.
5. Pre-order made by the customer on the Asphalt website only
6. Start of production once the sales period is over
7. Delivery of orders within 1 to 4 months
8. Measurement of customer satisfaction to enrich the next phases of product development

This process requires significant internal resources and adequate capacities to create and strengthen the brand's bond with its community (eg social networks) and to develop products according to the customer's expectations (close link between the designers and the analysts in a "project by product" process). The relationship with the customers is entirely digital, from creation to delivery. The notion of community, and of production for the community and not for an individual, is central to the process. The partners for the production process must also be identified and capable of providing the high quality work to suit Asphalte's needs.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

The technologies used are rather simple: the system is based above all on the relationship between the brand and its community (mastery of social networks, digital surveys and their interpretation), on a good network of partners and on the company's ability to create products that respect the demands of its community.

Manufacturing takes place in several countries depending on the products (Portugal, Eastern Europe, Maghreb, Vietnam, Japan in particular).

Asphalt seeks to produce little but well. In the first three years of the brand's existence, only 39 products were created.

## 5. INTERNATIONAL

Asphalte works with foreign partners for production (Portugal, Eastern Europe, Maghreb, Vietnam, Japan in particular) and sells internationally. The system of production by pre-order allows for an excellent quality/price ratio and to satisfy an international demand for this type of product and a brand that listens to its customers when designing its products. The company can respond, with one collection, to the demand from an international community.

## 6. SOURCES

<https://asphalte.com/pages/comment-ca-marche>  
[https://business.lesechos.fr/entrepreneurs/idees-de-business/0603579777926-mode-asphalte-detricote-le-business-model-classique-des-marques-339341.php#formulaire\\_enrichi::bouton\\_google\\_inscription\\_article](https://business.lesechos.fr/entrepreneurs/idees-de-business/0603579777926-mode-asphalte-detricote-le-business-model-classique-des-marques-339341.php#formulaire_enrichi::bouton_google_inscription_article)  
<https://fr.fashionnetwork.com/news/Asphalte-trace-sa-route,1076058.html>

## PRODUCTION ON DEMAND VIA COMMUNITY MANAGEMENT

### 1. WHICH?

“Grupo Valérius” is group of companies with a strong industrial nature on garment production, capable of a production level of 25 000 pieces per day with a large export volume. In 2018, the annual turnover exceeded 30 millions Euros.

#### MAIN MARKETS:

- |                      |                                     |             |                          |
|----------------------|-------------------------------------|-------------|--------------------------|
| - Home textiles      | <input type="checkbox"/>            |             |                          |
| - Technical textiles | <input type="checkbox"/>            | Agrotech    | <input type="checkbox"/> |
|                      |                                     | Buildtech   | <input type="checkbox"/> |
|                      |                                     | Clothtech   | <input type="checkbox"/> |
|                      |                                     | Geotextiles | <input type="checkbox"/> |
|                      |                                     | Homotech    | <input type="checkbox"/> |
|                      |                                     | Indutech    | <input type="checkbox"/> |
|                      |                                     | Meditech    | <input type="checkbox"/> |
|                      |                                     | Mobitech    | <input type="checkbox"/> |
|                      |                                     | Oekotech    | <input type="checkbox"/> |
|                      |                                     | Packtech    | <input type="checkbox"/> |
|                      |                                     | Protech     | <input type="checkbox"/> |
|                      |                                     | Sportech    | <input type="checkbox"/> |
| - Fashion / Apparel  | <input checked="" type="checkbox"/> |             |                          |

#### TEXTILE VALUE CHAIN:

- |                               |                          |   |                                     |
|-------------------------------|--------------------------|---|-------------------------------------|
| - Raw material                | <input type="checkbox"/> | - Printing / Silkscreen printing                          | <input type="checkbox"/>            |
| - Preparation and Spinning    | <input type="checkbox"/> | - Accessories (Lace / Embroidery / Label / Trimming, ...) | <input type="checkbox"/>            |
| - Sorting/Material separation | <input type="checkbox"/> | - Pattern making  | <input checked="" type="checkbox"/> |
| - Knitting                    | <input type="checkbox"/> | - Clothing manufacturer                                   | <input checked="" type="checkbox"/> |
| - Weaving                     | <input type="checkbox"/> | - Home textile producer                                   | <input type="checkbox"/>            |
| - Non-woven                   | <input type="checkbox"/> | - Technical textile producer                              |                                     |
| - Dyeing / Finishing          | <input type="checkbox"/> | - Distribution  | <input checked="" type="checkbox"/> |
| - Coating                     | <input type="checkbox"/> | - Recycling   | <input type="checkbox"/>            |



## 2. WHY?

In 2017, VALÉRIUS started an experiment on the use of digital tools and digital communities to boost sales. A business model was developed based on bloggers and its community of followers. As a digital influencer, a blogger can be a powerful element in brand and product communication and, therefore, convert that into sales. The business model also gave a bigger role to the blogger, involving them in the creative and design process of the garment pieces, in order to have a strong connection between the product, blogger and their followers, so the brand is the blogger. The communication and marketing are up to the blogger, being the company responsible for the shipping and distribution.

This experiment took place in UK, between 2019 and 2020, with British bloggers, and a British partner. The results and evaluation are expected to be known before the end of 2020, although the pandemic situation may interfere with this agenda.

## 3. WHAT?

If this experiment comes to be considered a success, this new business model will require a team and the participation of all areas of the company, in fact, a new business unit. From the production or industrial perspective, the impact of this business model is seen as low, although the company may face an increasing low-volume orders quantity.

## 4. HOW? TECHNOLOGIES / ORGANIZATIONS

What stands out in this case is the use of experimentation as a tool to test and stress new ideas. With digital technologies and new digital business models, experimentation is key to test an idea before investments and organizational changes are made.

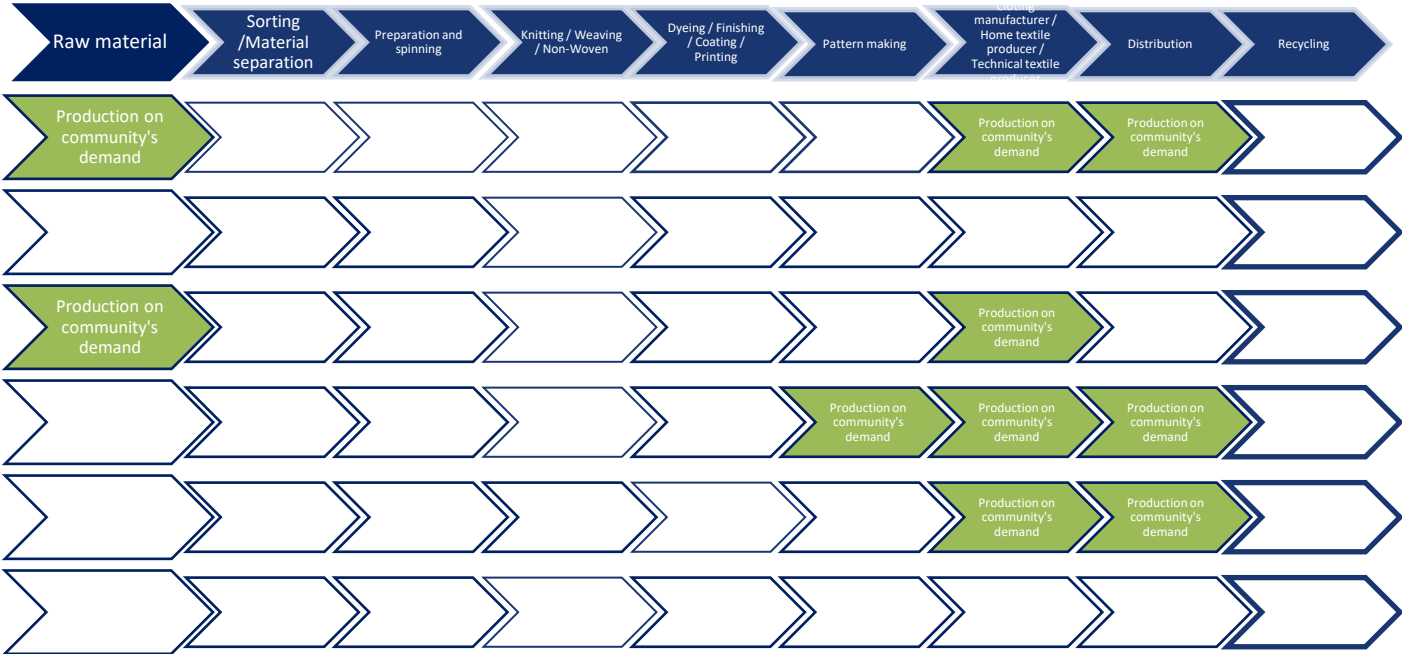
## 5. INTERNATIONAL

This initiative challenged the traditional business model of the company, in two ways. The first was the exploitation of the new online channels, and the other was the partnership with a non-traditional customer/partner, in this case the blogger.

## 6. SOURCES

CRITICAL ELEMENTS IN THE TEXTILE VALUE CHAINE

- Design / Creation / R & D & I
- Purchasing / Supplier relations
- Production
- Marketing / Branding
- Sales / Customers relationship
- Human ressources



Strength    Weakness    Missing