TRA MA

Co-funded by the European Union

Understanding the Fashion Supply Chain

Handbook for Practitioners

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1. Introduction

The fashion industry, with its enormous impact on both our lives and our environments, is built on a complex ecosystem of the fashion supply chain.

From the very origins of raw materials to manufacturing, transportation and distribution to the end stages of product consumption and product afterlife management, every step in the fashion supply chain holds immense significance. As the global fashion industry is facing environmental and ethical concerns affecting both our environments and societies, demand for total transparency and transparent practices are on rise. Fashion producers and fashion consumers are in need of gaining new skills and knowledge in transparency that empowers them to effect positive change.

It is important to remember that every garment, every accessory, shoe or piece of jewellery has its own life time, origin, materiality, value and impact on environments and people around them. Current ultra fast fashion consumption based on out-sourced production in Asian and African countries led us to the world where the majority of western world consumers consume fashion goods without questioning its value, impact or origin and where it's not spoken about the journey of our garments travelled thousands of kilometres around the globe and went through the hands of dozens of people.

2. Methodology

The educational handbook Understanding Fashion Supply Chain is designed to engage adult **learners** working across diverse roles within the fashion industry, including designers, buyers, supply chain managers, garment technicians, technologists, merchandisers, and stylists. This handbook provides **educators**, **mentors**, or **trainers** with a comprehensive resource to teach learners about current practices in the fashion supply chain.

It covers different stages, geographical developments, and environmental problems in the field. The handbook comprises a series of five activities structured according to the following: Name, Learning Aim, Learning Objectives, Level, Length, Target Group, Materials, Instructions, Reflection, Methodology Tips and Online Tips, with Final Assessment and a list of useful online Resources at the end of the handbook.

By understanding the significance of the fashion supply chain, learners are equipped to contribute to a more sustainable future, where fashion aligns with ethical values, transparency and environmental consciousness.

3. Learning Objectives

FASHION SUPPLY CHAIN

- Develop awareness of the geographical aspect of the fashion supply chain.
- Identify the various types of fashion supply chain stages.
- Critically analyse the environmental and social impact of the fashion supply chain on our planet.

STAGE 1: RAW MATERIALS

- Critically analyse fabrics, showing advanced knowledge of textiles.
- Connect cultural aspects to fabrics, emphasising a holistic approach in garment production.
- Utilise strategic thinking in elevating garment value and sustainability through thoughtful textile choices.

STAGE 2: MANUFACTURING

- Identify the different types of production systems used in the fashion industry.
- Develop awareness of the stages of the production process.
- Identify the importance of sustainability and ethics in production systems and processes.

STAGE 3: TRANSPORTATION AND DISTRIBUTION

- Identify the environmental impact of the fashion supply chain, with a focus on a white t-shirt's journey from a fast fashion retailer.
- Utilise basic maths skills in relation to distribution in supply chain by counting the actual transportation costs for a single white t-shirt, considering factors such as weight, fuel consumption, and travel distance.
- Develop awareness of environmental consequences in fashion transportation, specifically emphasising carbon dioxide emissions and the overall ecological footprint.

STAGE 4: FASHION PRODUCT CONSUMPTION AND PRODUCT AFTERLIFE

- Develop awareness of different phases of the fashion product consumption process.
- Analyse eco-modulation factors in relation to fashion products through awareness of Extended Producer Responsibility.
- Identify reasons of why the fashion product consumption and afterlife became an alarming problem of the fashion industry.

4. Activities

4.1. Activity 1

NAME
FASHION PRODUCT LIFE CYCLE GEOGRAPHY

LEARNING AIM
The aim of this activity is to develop awareness of the connections that our fashion products make with the lives of people elsewhere in the world, understanding the route the fashion goods took on their way to the store where they are being sold, and where they usually end up after we stop using them.

LEARNING OBJECTIVES
- Develop awareness of the geographical aspect of the fashion supply chain.
- Identify the various types of fashion supply chain stages.
- Critically analyse the environmental and social impact of the fashion supply chain on our planet.

LEVEL
Intermediate, some World geography knowledge is required (use of a blind map).

LENGTH
1 - 1,5 hour

TARGET GROUP
Adult learners working in various roles within the fashion industry, including designers, buyers, and supply chain managers.

MATERIALS
1. Outline world map.
2. Cards describing the life cycle of a fashion product - t-shirt / dress / earrings.

INSTRUCTIONS
After a short introduction into fashion supply chain:

Fashion goods are made of different materials, parts and components. Before these materials become a garment, a piece of jewellery or shoes they travel thousands of kilometres and then, as a completed product, they continue to travel even further to be sold on store shelves all around the world. Fashion goods travel so far for a number of reasons. First one is the use of cheap labour in Third World countries. Another is the impossibility of

growing cotton or other plant fibres in all climatic conditions or mining gold in a particular area. Third is the location of specialist skills and technologies - e.g. for embroidery, weaving and dyeing - in different parts of the world.

Learners will be asked following questions:

- *Do you ever look at fashion goods labels to find out where they were made?*
- *Do you think all the work that went into the production of fashion goods took place only in the 'made in' country listed on the label?*
- *Do you have any idea what the life cycle of fashion goods is like?*

Next, divide the learners into groups of 3-5, and give each group an even number of cards and one outline world map - choose 1 series of a product life - t-shirt, dress or earrings. You can also choose all three examples of products within one workshop session and give each group a different fashion product life cycle. Ask the learners to place the cards on the blank map according to where they think each stage of the life cycle is located. Then ask them to suggest in which phase of the life cycle the cards are located and what the overall life cycle of the selected piece of clothing could therefore look like. After 10-15 minutes of discussion, ask each group to present their suggestions and start a bigger discussion about the order and location of each stage in this t-shirt's life cycle.

REFLECTION

Once this task is complete, ask the learners to reflect on what they have learned.
Start the discussion by asking the following questions:

- *How did you feel when you saw how long the journey of a fashion good can be?*
- *Do you think it is necessary for your favourite fashion product to travel much more than you do? Is the journey of fashion goods traceable?*
- *What do you think is right and wrong with the current production of clothes, shoes, jewellery, etc. for fast fashion?*
- *How many people do you think might work to make, transport and sell one fashion product?*
- *What do you think should be changed and how? How can you influence the life cycle of your clothes, shoes, accessories including where they end up when you have finished with them?*

LIST OF CARDS

<u>WHITE JERSEY T-SHIRT</u>

1. Design

The team of designers in Europe working for a brand that sells t-shirts creates a few clothing collections a year. For one collection, they designed this very white cotton t-shirt, which they then commissioned for production in the Savar region of Bangladesh.

2. Primary raw material

Cotton is a natural fibre derived from the cotton plant. The cotton in our t-shirt was grown in a field in the state of Talengan in central India.

3. Fibre production

The raw cotton harvested in Talengan, India was bought by a factory producing cotton yarn in the state of Tamil Nadu about 800 km away. This mill produced from it a birch-coloured cotton yarn from it.

4. Dyeing and bleaching

This cotton yarn was transported to a textile dyeing and bleaching factory around 2200 km away in the centre of the city, Dhaka, the largest metropolitan and industrial area of Bangladesh with a population of about 22 million people. Here, its beige colour was bleached to a bright white. This process involved the use of toxic chemicals that were later washed into the Dhaleshwari River which is famous for the rapid loss of biodiversity as a result of chemical pollution from factory dyes and bleaches.

5. Textile knitting

This cotton yarn was later sold to a knitting facility in the Gazipur region of Bangladesh,. There, it was turned into a fabric called jersey which is suitable for making ordinary t-shirts.

6. Pattern cutting, sewing, linking and garment completion

This jersey fabric was then transported around 200 km to the Savar region of Bangladesh made into t-shirts. The region became infamous on 24 April 2013 when 1,138 workers died during the collapse of the neglected and inadequately operated Rana Plaza clothing factory complex. The production of our white t-shirt involved several phases that took place in different parts of a factory in Savar. In the first phase, its body, neck and sleeve panels were cut from huge sheets of cotton jersey. These were subsequently sewn or linked together to make the t-shirt in separate workshops, where each worker was responsible for sewing or linking the same seam - e.g. joining the neck to the body - several thousand times a day during a work shift that was often 12 hours a day long, 7 days a week.

7. Packaging and shipping

Now complete, our white t-shirt was packed in containers with hundreds of thousands of identical others and driven on a truck to the Indian port city of Kolkata 350 km away. There,

the container was loaded, just like thousands of others, on an international cargo ship whose journey had started originally in Beijing, ready to sail to the Italian port of Trieste.

8. Transport

The t-shirt took a month-long journey on this cargo ship travelling around 6,600 nm (approx 12,200 km), and consuming thousands of litres of fuel oil. On arrival in Trieste, its container is unloaded from the ship by a transport company and placed on a truck (distance was calculated at ports.com).

9. Distribution centre

The t-shirt's container was then driven from Trieste to the brand's distribution centre in the German state of Hessen, about 950 km away. Germany is the European country which imports the most textile products made in Bangladesh. From the distribution centre in Hessen, the brand's clothes can be delivered to stores not only all over Germany, but also in Denmark, the Benelux countries, France and Austria. Our t-shirt was sent to the city of Vienna in Austria where our t-shirt brand owns 3 shops.
Here, our t-shirt was stored for several weeks in one of the brand's warehouses near Vienna, even after the launch and sale of the new collection of which it was designed to be part began.

10. Sale

Almost at the end of the season, our t-shirt was delivered to one Vienna store for sale as a discounted product and its price dropped from the original 29 EUR to 9 EUR. It was later bought at this discounted price. The brand still profited from the sale, because the production, transport and retail cost of this t-shirt was only 5 EUR.

11. Consumer (me)

You bought this t-shirt 'on sale' in a store in Vienna for 9 EUR. You wore it a few times and, although you washed it at the recommended temperature of 40C, after a few washes, the seams rolled over. After two years of storing it unworn in your closet, you realised that it no longer looked good and decided to get rid of it.

12. Textile waste container

You were aware that there was a textile waste collection container a few blocks away from where you live in Vienna (Austria). The container's green colour and stylish branding made you think that the collecting company would donate your old white t-shirt to someone who needed it. In good faith, you threw it in the container with other clothes you didn't want anymore.

13. Sorting station

Your t-shirt, and other unwanted clothes, was taken from this container to a sorting station on an industrial estate on the outskirts of Vienna, where it was classified - like 10% of recycled clothing - as suitable for resale in second-hand clothing markets in Europe.

Of the remaining 90%, 45% was sold for downcycling into car seat fillings, 10% was burned, 30% was directly exported to developing countries to be sold to textile dealers, and 5% went directly to those in need locally (e.g. homeless people).

14. Second hand dealer

The saleswoman hung your t-shirt on the display. It was valued based on its quality and the brand listed on the label. The second-hand store is part of a larger chain of second-hand clothing stores across several European countries. After a few weeks nobody had bought it, so it was bagged up and loaded onto a truck to be sold in the chain's store in Bratislava (Slovakia).

15. Dump

Unfortunately, nobody was interested in buying your t-shirt in any of these stores. The chain then resold it, along with lots of other unsold second-hand goods, to a dealer in used textiles who sent it on a huge container ship that stopped off in various African port cities. Your t-shirt ended up at a market stall in the city of Nairobi (Kenya). It is a street market similar to ones in Europe where used clothes are resold as second-hand clothes. But nobody wanted to buy your t-shirt here either so it was packed into a black plastic bag and driven to the city's Dandora solid waste dump, one of the largest landfill sites in Africa covering an area of 12 hectares. The bag was thrown in there with countless others and this is where your t-shirt remains.

PINK POLYESTER DRESS

1. Design

The team of designers in Europe working for a brand that sells dresses creates a few clothing collections a year. For one collection, they designed this polyester dress in a very trendy colour of the year called Viva Magenta which they then commissioned for production in the Savar region of Bangladesh.

2. Primary raw material

Polyester is a synthetic fibre extensively used in the garment industry. As a synthetic polymer, its raw material source is petrochemicals derived from crude oil. It is estimated 342 million barrels of oil are used for producing plastic-based fibres each year. Crude oil was this time extracted in the Siberia area in Russia.

3. Fibre production

Barrels filled with crude oil extracted in Russia were bought by a factory producing polyester - a Chinese company that is a major player in the production of polyester fibre - in the province called Jiangsu in China. This company's existing polymerization capacity is 2400000 tons per year, which ranks as the sixth-largest polyester manufacturer in the world. Polyester production, including polymerization, chip production, and filament extrusion, was done under one roof in a vertically integrated facility.

4. Textile knitting

This polyester yarn was later sold to a knitting factory 100 km away in the same province-Jiangsu. Polyester filament yarn has undergone a texturing process to introduce crimps or twists, giving the yarn a bulkier and more textured appearance. The polyester yarn was knitted in the fabric called jersey.

5. Dyeing and finishing

The fabric was transported to a textile dyeing factory 50 km away from the knitting factory. Textile manufacturing in China often occurs in clusters, where multiple related industries are concentrated in specific areas. These clusters allow for better collaboration, access to resources, and streamlined supply chains. The province hosts various dyeing operations as part of the broader textile manufacturing process. This dyeing and finishing process involved use of toxic chemicals that were later washed into Yangtze River. Approximately 40% of the water in the Yangtze River is currently highly polluted and unsuitable for human contact.

6. Pattern cutting, sewing and garment completion

This Viva Magenta fabric was then transported around 4300 km to the Savar region of Bangladesh made into dress. The region became infamous on 24 April 2013 when 1,138 workers died during the collapse of the neglected and inadequately operated Rana Plaza clothing factory complex. The production of our pink dress involved several phases that took place in different parts of a factory in Savar. In the first phase, its body and sleeve panels were cut from huge sheets of polyester jersey. These were subsequently sewn together to make the dress in separate workshops, where each worker was responsible for sewing the same seam - e.g. joining the neck to the body - several thousand times a day during a work shift that was often 12 hours a day long, 7 days a week.

7. Packaging and shipping

Now complete, our pink dress was packed in containers with hundreds of thousands of identical others and driven on a truck to the Indian port city of Kolkata 350 km away. There

the container was loaded, just like thousands of others, on an international cargo ship whose journey had started originally in Beijing, ready to sail to the Italian port of Trieste.

8. Transport

The dress took a month-long journey on this cargo ship travelling around 12,200 km, and consuming thousands of litres of fuel oil. On arrival in Trieste, its container is unloaded from the ship by a transport company and placed on a truck. (distance was calculated at ports.com)

9. Distribution centre

The dress's container was then driven from Trieste to the brand's distribution centre in the German state of Hessen, about 950 km away. Germany is the European country which imports the most textile products made in Bangladesh. From the distribution centre in Hessen, the brand's clothes can be delivered to stores not only all over Germany, but also in Denmark, the Benelux countries, France and Austria. Our dress was sent to the city of Vienna in Austria where our dress brand owns 3 shops.
Here, our dress was stored for several weeks in one of the brand's warehouses near Vienna, even after the launch and sale of the new collection of which it was designed to be part began.

10. Sale

Almost at the end of the season, our pink dress was delivered to a store in Bratislava for sale as a discounted product and its price dropped from the original 39 EUR to 12 EUR. It was later bought at this discounted price. The brand still profited from the sale, because the production, transport and retail cost of this dress was only 6 EUR.

11. Consumer (me)

You bought this dress 'on sale' in a store in Bratislava for 12 EUR. You wore it a few times and, although you washed it at the recommended temperature of 40C, after a few washes, the seams rolled over. After two years of storing it unworn in your closet, you realised that it no longer looked good and decided to get rid of it.

12. Textile waste container

You were aware that there was a textile waste collection container a few blocks away from where you live in Vienna (Austria).The container's green colour and stylish branding made you think that the collecting company would donate your old pink dress to someone who needed it. In good faith, you threw it in the container with other clothes you didn't want anymore.

13. Sorting station

Your dress, and other unwanted clothes, was taken from this container to a sorting station on an industrial estate on the outskirts of Vienna, where it was classified - like 10% of recycled clothing - as suitable for resale in second-hand clothing markets in Europe. Of the remaining 90%, 45% was sold for downcycling into car seat fillings, 10% was burned, 30% was directly exported to developing countries to be sold to textile dealers, and 5% went directly to those in need locally (e.g. homeless people).

14. Second hand dealer

The saleswoman hung your dress on the display. It was valued based on its quality and the brand listed on the label. The second-hand store is part of a larger chain of second-hand clothing stores across several European countries. After a few weeks nobody had bought it, so it was bagged up and loaded onto a truck to be sold in the chain's store in Bratislava, Slovakia.

15. Dump

Unfortunately, nobody was interested in buying your dress in any of these stores. The chain then resold it, along with lots of other unsold second-hand goods, to a dealer in used textiles who sent it on a huge container ship that stopped off in various African port cities. Your dress ended up at a market stall in the city of Nairobi (Kenya). It is a street market similar to ones in Europe where used clothes are resold as second-hand clothes. But nobody wanted to buy your dress here either so it was packed into a black plastic bag and driven to the city's Dandora solid waste dump, one of the largest landfill sites in Africa covering an area of 12 hectares. The bag was thrown in there with countless others and this is where your dress remains.

ROSE QUARTZ EARRINGS

1. Primary raw material

The extraction of rose quartz began in Madagascar, in the Anjoma Ramartina region. Untrained miners extracted the raw crystals from the mines which are set up without any professional engineering technology. Such a process requires a huge physical endurance and strength as miners dig and move large and heavy chunks of crystals for several hours. Child labour, slavery and below minimum wages are among common practices of extracting minerals in Madagascar. The work environment is extremely unsafe, with constant concerns about collapses and injuries due to the lack of proper safety measures, tools or engineering procedures. The extraction process contributes to ecological degradation, affecting not only the livelihoods of local communities but also the broader environmental balance.

2. Sorting and processing

After the extraction from a mine, raw rose quartz crystals travelled around 320 km to the capital city of Madagascar, Antananarivo, to be sorted and initially processed, for example abraded, for further manufacturing.

3. Transportation for manufacturing

The processed rose quartz was shipped from Antananarivo to a 350 km far Toamasina, a major Madagascan port. In Toamasina, rose quartz crystals were loaded into containers on a transoceanic ship. Ready to start around 10 000 km long journey to a manufacturing facility in Shenzhen, China.

4. Cutting and shaping

After its arrival to Shenzhen port, rose quartz was transported to the 60 km far processing facility where workers cut and shaped the rose quartz into the required shapes of components for a subsequential earring production.

5. Design and assembly

From the processing facility rose quartz components were transported to the manufacturing facility in the city of Guangzhou, around 130 km far from Shenzhen. This facility producing jewellery was responsible for an earring assembly using rose quartz components and small silver frames. Such silver frames were formed in a nearby silversmith facility which used raw silver from Fankou Mine, one of the biggest silver mines in China, around 280 km far from Guangzhou. Silver mining in China is notoriously related to water and soil pollution and belongs among the most destructive practices for both the environment and people in the Chinese industry. This assembly stage involved both manual craftsmanship and automated processes and was done according to the initially selected designs, developed by a head designer within the facility. The final product was packed into labelled boxes together with thousands of other earrings.

6. Transcontinental distribution

Boxes with rose quartz earrings were transported to the containers on the transoceanic ship ready to be shipped to Rotterdam, the Netherlands. This journey is usually around 15 000 km long. However, due to a disruption of distribution routes in the Red Sea, the ship had to sail across the south of the African continent. An additional 13 000 km were added to the total distance of transporting the earrings from Guangzhou to Rotterdam.

7. Local distribution and sale

Boxes of rose quartz earrings were distributed from Rotterdam port across the shops, distribution and retail centres, across North and West Europe. Our example of a pair of

earrings was shipped around 700 km to a wholesale store in Berlin which specialises in selling well being and spiritual products. Later, an online order was made by a customer (me) and the pair of earrings was shipped to Brno, Czech Republic, around 550 km away from Berlin.

8. Use and product afterlife

After two years of occasional wear of earrings the consumer (me) lost its right pair. The left earring was stored in the consumer's box with other unused jewellery for several years.

METHODOLOGY TIPS

- The educators will have at their disposal a list of the cards in the right order, which they can let the learners look at after the activity has been completed, for example:

WHITE JERSEY T-SHIRT:
Design
Primary raw material
Fibre production
Textile knitting
Dyeing and finishing
Pattern cutting, sewing and garment completion
Packaging and shipping
Transport
Distribution centre
Sale
Consumer (me)
Textile waste container
Sorting station
Secondhand dealer
Dump

TIPS FOR ONLINE

Instead of using a physical copy of the outline map and cards, this activity can take place online. Learners with access to computers and the Internet can use online platforms like Whiteboard, Mural or Miro for this task.

4.2. Activity 2

NAME
INCREASING GARMENT VALUE WITH A TEXTILE MANIPULATION

LEARNING AIM
This activity aims to offer an initial research toolkit to crafters, makers, designers, artists or technicians to analyse the value of textiles used in their garment production process and choose an appropriate textile manipulation technique to increase the value of a piece of garment.

LEARNING OBJECTIVES

- Critically analyse fabrics, showing advanced knowledge of textiles.
- Connect cultural aspects to fabrics, emphasising a holistic approach in garment production.
- Utilise strategic thinking in elevating garment value and sustainability through thoughtful textile choices.

LEVEL
Intermediate

LENGTH
1,5 hour

TARGET GROUP
Adult learners working in various creative and manufacturing roles within the fashion industry, including designers, garment technicians and technologists, merchandisers or stylists.

MATERIALS

1. Sheets of fabric suitable for observation and experimentation (sheet size unabling folding, draping, pleating, etc.).
2. PC/ Laptop/ Tablet/ Phone with internet access .
3. Books, journals, magazines about textiles, textiles techniques.
4. Paper.
5. Pen.
6. Pins.

INSTRUCTIONS

After a short introduction into the contemporary theories about material value:

The cost, value and worth of commodities have become blurred. We are no longer seeing value in our possessions, but instead seeing them as disposable, our relationship to our clothes has been distorted.

We have become disengaged with our material environment, losing sight of an object's value and how they have been made. Garments are frequently purchased and discarded without consumers considering the impact on our environment.

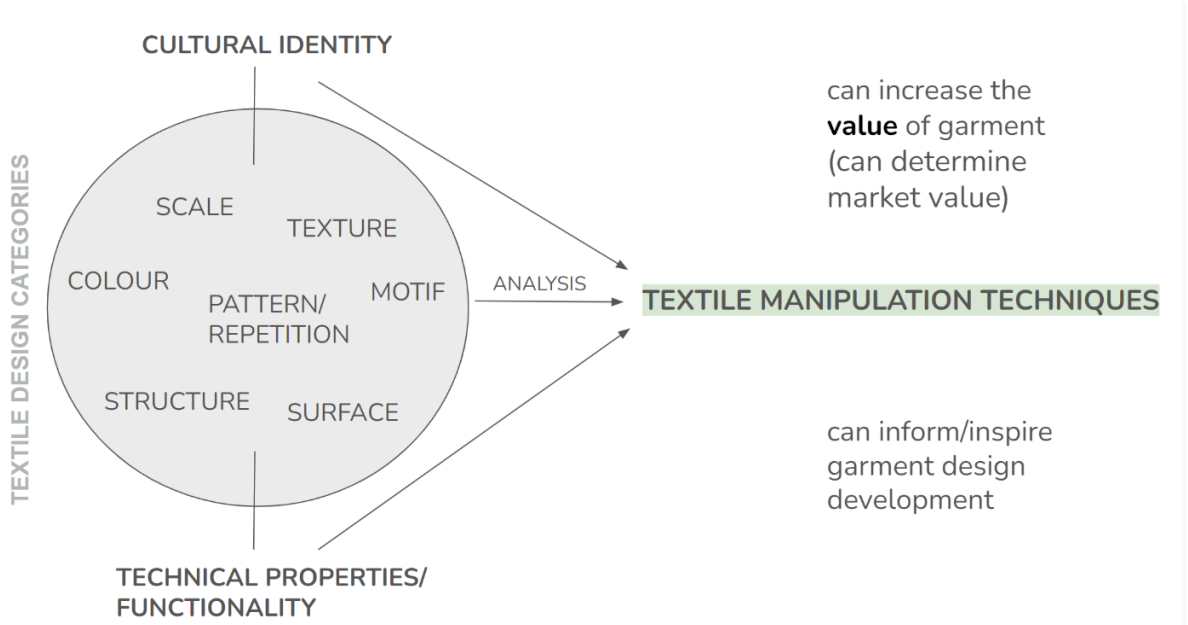
In the fast fashion sector, synthetic and low-cost materials are prevalent, chosen for their affordability rather than their sustainability or durability. These textiles are often produced rapidly, allowing for the quick creation of trendy, disposable garments to meet the ever-changing demands of fashion trends.

Craftsmanship and traditional techniques are sidelined in a mass production of clothing. Garments are often assembled through rapid and automated processes, leaving little room for the intricate details and meticulous handwork that characterise artisanal craftsmanship. This approach not only compromises the quality of the final product but also contributes to a culture of disposable fashion, where garments are worn briefly before being discarded.

Textiles might have many different structures, textures, surfaces, patterns and colours, all based on their materials properties and properties of its raw materials such as strength, flexibility, elasticity, softness, durability, heat insulation, weight. They can drape, fold, pleat, twist, pintuck, ruffle, pucker, gather, etc. Through different manipulation techniques textiles can change their identity, become something different, new and upgraded. A garment value can be therefore increased with the craftsmanship of a textile manipulation.

Each learner is given (can use their own resources) a fabric/fabrics to work with during the workshop. Learners can work individually, in pairs or in groups of 3.

Introduce the following scheme to learners:



Learners will be asked to carry out their own research on following tasks through answering given questions and writing down their findings on a piece of paper/laptop.
They are also asked to fully interact with their fabric through tactile and (audio)visual observation.

TASK 1: (15 mins + 5 mins group presentation)

ANALYSE TECHNICAL PROPERTIES AND FUNCTIONALITY OF YOUR GIVEN FABRIC:

1. (BIO)CHEMICAL COMPOSITION / RAW MATERIAL
   - What is the primary raw material/s of your fabric?
   - What are its properties?
   - What was its production process?
   - What is its geographical and historical origin? (give different examples)
   - Can you find some examples of producers of the particular raw material? (countries, companies, etc.)
   - What is the ecological footprint of its production / life cycle?

2. CONSTRUCTION TYPE & FINISHING

- What is the construction type of your given fabric? (woven, knit, non-woven, etc. - focus on a detailed description: type of woven fabric: plain, twill, satin, basket, etc.)
- What technology/ machinery does this construction method use?
- Was there a finishing process or embellishment involved?

3. MATERIAL PROPERTIES

- Describe your fabric with a technical vocabulary - Is the fabric: flexible, elastic, soft, durable, heat insulating, loose/tight, heavy/light, water absorbent/repellent, dyeable and resistant to chemicals?
- Describe the areas of use of your given fabric (medicine, fashion, interiors, etc.)

TASK 2: (15 mins + 5 mins group presentation)

CREATE A MIND MAP DESCRIBING CULTURAL IDENTITY OF YOUR GIVEN FABRIC BY DEFYING THE FOLLOWING:

- What aesthetic styles/ subcultures/ visual narratives you associate with your given fabric? (punk? folk? preppy? norm-core? utility? emo? luxury? etc.)
  (MINIMUM 3 examples - find more keywords related to them)
- What designers/ artists worked with this fabric?
- What human activity/ behaviour is related to your fabric? (horse riding? work? leisure? ice-hockey? sleep? wedding? etc.)

TASK 3: (15 mins + 5 mins group presentation)

CREATE A MIND MAP BY ANSWERING FOLLOWING QUESTIONS REGARDING TEXTILE MANIPULATION:

- What textile design categories are according to you interesting in relation to your chosen fabric? (scale? pattern? motif? colour? structure? texture? surface?)
- How does your fabric behave? Can you drape it/ pleat it/ quilt it/ embroider into it?
- What resources and skills do you have? How much time do you have for your project?
- What textile manipulation techniques could you try with your chosen fabric? Why?
- With what other fabrics you could combine your given fabric? Why? (aesthetic-visual mood? technical similarities or differences? juxtaposition of textures?)

REFLECTION

As an evaluation/reflective exercise ask learners the following questions:

- *In what ways did this activity enhance your understanding of the value of textiles in*

garment production?

- *What textile manipulation techniques would you like to explore in your process of making a garment and what is your rationale for selecting them?*
- *How can the insights gained from analysing your fabric contribute to more sustainable and value-driven choices in your creative or manufacturing role?*

METHODOLOGY TIPS

- Use real-life examples and case studies to illustrate concepts. Help learners with finding out data about different construction types of textiles - provide learners with a physical material library of different textiles to show different textural or structural qualities - knit x woven.
- Encourage learners to share their experiences and insights through short group presentations after every task, fostering a collaborative learning environment.

TIPS FOR ONLINE

- Use multimedia elements to enhance online engagement. Incorporate interactive elements such as online polls with QR codes to list different textile manipulation techniques learners might already know themself.
- Share additional resources and readings for self-paced learning, especially resources about different textile manipulation techniques.

4.3. Activity 3

NAME
GARMENT PRODUCTION PROCESSES

LEARNING AIM
The learning aim of this activity is to visualise the journey of garment production processes and to understand what kind of activities should be done from the beginning till the end of the manufacturing process. Learners will try to put together cards in order they think the garment production process looks like. Then will check if they understand the order right.

LEARNING OBJECTIVES

- Identify the different types of production systems used in the fashion industry.
- Develop awareness of the stages of the production process.
- Identify the importance of sustainability and ethics in production systems and processes.

LEVEL
Intermediate, some level of garment production knowledge is needed.

LENGTH
1 - 1,5 hour

TARGET GROUP
Adult learners working in various roles within the fashion industry, including designers, buyers, and supply chain managers.

MATERIALS

1. 3-5 full deck of cards describing the garment production system.
2. 1 card with the right card order.

INSTRUCTIONS
After a short introduction into garment production processes:

The garment production process involves a series of steps from the initial design concept to the final manufacturing of a garment. The foundational manufacturing process within the garment industry has remained relatively unchanged for the past century, predominantly following the progressive bundle system. In this approach, work or operations are strategically planned so that each operator specialises in specific tasks. The initial step involves cutting the fabric into various garment panels, which are then organised based on the components of the garment. Subsequently, these panels are bundled together, secured, and dispatched to the assembly (sewing) section for the actual garment production.

Learners will be asked following questions:

1. *What is the beginning of the garment production process?*
2. *How many steps are needed to finish the garment in the production process?*
3. *What is a production bundle system good for?*

Divide the learners into groups of 3-5. Each group will receive one complete deck of cards. Ask the learners to place cards in the order from the first to latest stages of the garment production process.

After 15 minutes learners compare their results with other groups and discuss the right order of garment production process.

REFLECTION

- *What a step in the deck of cards that surprised you? Why?*
- *What is your idea to make this garment production system much more effective?*
- *Why do you think this bundle production system that you visualised is used in fast fashion?*

LIST OF CARDS

Design/Sketch A particular style of design/ sketches with measurement mainly comes from the buyer to manufacturer.
Material sourcing Source all the materials and trimmings that will be used to create your garments.
Basic Block Basic block is an individual element of garments, which is created as a foundational pattern.
Working Pattern This pattern is generally made by tracing the basic blocks on paper and requires fitting and adjustments.
Sample Garments After making a sample, it is sent to the buyer for approval to correct the faults and write comments on sample garments.
Approved Sample After re-correct the sample faults, it is again sent to buyers. If it is ok, then it is called an approved sample.
Costing In this stage apparel merchandiser prepares a costing sheet for the buyer. Including fabric costing, cost of making (CM) charged, trimmings, profit, etc.
Production Pattern Refers to the final and actual product in the fashion industry.
Grading Different sizes should be graded as per buyer requirement like S, M, L, XL, XXL.

Marker Making For a particular style of garments, marker is made with a thin paper which contains all the components of different sizes.
Fabric Spreading In this stage fabric is spread on the table properly for cutting. It is done manually or in a computerised way.
Cutting Fabric cutting is done according to marker dimension.
Sorting and bundling Sorting out the fabric according to size and colour and for each size making individual bundles.
Sewing Sewing department is called the heart of apparel manufacturing. In this section, an entire garment is assembled by sewing.
In-line Inspection This inspection is done at the time of production, so that any defect occurring may be located at the earliest stage.
Ironing and Finishing Complete garments are sent to the finishing section for ironing and also other finishing processes are done like extra loose thread cutting, measurement checking, etc.
Tagging All labels and tags are attached with garments such as price tag, size tag, care label, etc.
Final Inspection Final inspection is very important for an export order shipment. Different parts of garments are inspected in this stage such as garments' main fabric, accessories, trims, labels, fabric faults, etc.
Garment packaging Final garment is placed in a cardboard box for export.
Dispatch Shipment Completely ready for shipment.

Garment production processes cards order
1. Design/Sketch 2. Material sourcing 3. Basic Block 4. Working Pattern 5. Sample Garments 6. Approved Sample 7. Costing 8. Production Pattern 9. Granding 10. Marker Making 11. Fabric Spreading 12. Cutting 13. Sorting and Bundling 14. Sewing 15. In-line Inspection 16. Ironing and finishing 17. Tagging 18. Final Inspection 19. Garment packaging 20. Dispatch Shipment

METHODOLOGY TIPS

- The educators will have at their disposal a list of the cards in the right order, which they can let the learners look at after the activity has been completed.
- Learners can be divided into groups. One deck of cards is distributed among the groups. Each group then tries to sort their cards. They then discuss with the other groups the correct order of all the cards.

TIPS FOR ONLINE

Instead of using a physical copy of cards, this activity can take place online with access to computers and the Internet by using online platforms like Whiteboard, Mural or Miro for this task.

4.4. Activity 4

NAME

TOXIC JOURNEY OF A ONE WHITE T-SHIRT FROM A FAST FASHION RETAILER - IS FASHION A TOXIC TRIP? HOW FAR OUR CLOTHES TRAVEL?

LEARNING AIM

The learning aim of this activity is to create awareness of the journey of a white t-shirt in fashion supply chain and its impact on the environment by calculating the real cost of transportation of a single white t-shirt from a fast fashion retailer

LEARNING OBJECTIVES

- Identify the environmental impact of the fashion supply chain, with a focus on a white t-shirt's journey from a fast fashion retailer.
- Utilise basic maths skills in relation to distribution in supply chain by counting the actual transportation costs for a single white t-shirt, considering factors such as weight, fuel consumption, and travel distance.
- Develop awareness of environmental consequences in fashion transportation, specifically emphasising carbon dioxide emissions and the overall ecological footprint.

LEVEL

Intermediate, some World Geography knowledge is required, as well as numeracy skills.

LENGTH

45 minutes.

TARGET GROUP

Adult learners working in various roles within the fashion industry, including designers, buyers, and supply chain managers.

MATERIALS

1. Calculator.
2. PC/ Laptop/ Tablet/ Phone with internet access.
3. Paper.
4. Pen.

INSTRUCTIONS

Share with learners the following introduction:

In recent times, the online sale of clothing and footwear has brought many innovations to the transport and logistics sector - large and rapid growth has required a real revolution in business. Instead of the previous delivery of one shipment with several packages to retail stores, especially in shopping malls - i.e. delivery to one address, we now have a situation where each individual package from such a shipment is delivered directly to the end customer. For the first time, online users are getting used to "bringing a changing cabin home", i.e. buying several products, trying them out and returning those they do not want to keep. As a result, our clothes often travel much longer and its carbon footprint is at least doubled.

Global carbon dioxide (CO2) emissions are one of the world's biggest problems, threatening the very survival of the planet Earth. Transport is responsible for 25% of CO2 emissions, due to the use of fossil fuels. With a simple mathematical example it is possible to show how much fuel is spent on transporting one single t-shirt.

Then calculate this:

1. Check the sewn-in labels in your clothes (you'll find these in t-shirts and pullovers at the neck or inside). Read where the item has been made. It says "Made in ..."

2. Find out where your t-shirt's label distribution centre or warehouse is from which the clothes come to shops.

3. Clothes travel from warehouse to shop by truck. One average truck carries one shipping container of 28 tons of clothes. The fuel consumption of such a truck is 23 litres per 100 km. Average weight of one t-shirt is 0,2 kg.

Let's calculate:

If

- one full container carries 28 tons of clothes,
- fuel consumption 23 l/100km,
- one t-shirt weighs 0,2kg,
- diesel fuel price 1,4 Eur/lit,
- distance 1000 km (from the distribution centre/warehouse to the shop).

A. How many t- shirts one full loaded shipping container carries on the truck?
B. When you find out the distance your truck travels from the city in which the warehouse is located to the shop, as well as today's price of diesel fuel, calculate how many litres of fuel the truck has consumed and what is the price of that fuel.
C. Calculate the price of fuel per t-shirt.
D. Use an online calculator such as Geodis to find out the amount of emissions of your t-shirts journey.

Note: Don't forget to convert tons into kilograms before the calculation!

- one full container carries 28 tons of clothes,
- fuel consumption 23 l/100km,
- one t-shirt weighs 0,2kg,
- diesel fuel price 1,4 Eur/lit.

A. How many t-shirts one full loaded shipping container carries on the truck?

28 000 kg / 0,2 kg = **140 000**

B. When you find out the distance your truck travels from the city in which the warehouse is located to the shop, as well as today's price of diesel fuel, calculate how many litres of fuel the truck has consumed and what is the price of that fuel.

DISTANCE (1000KM) with fuel consumption 23 l/100km =
10 x 23 = 230 l x 1,4€ = 322 €

C. Calculate the price of fuel per t-shirt.

322 / 140 000 = 0.0023 €

D. Use an online calculator such as Geodis to find out the amount of emissions of your t-shirts journey from a distribution centre to the shop where you purchased it. You can also use this calculator to estimate the impact of the journey of your t-shirt from the factory where it was made.

REFLECTION

- *How difficult was to find a distribution centre/ supply chain stages from the label on your T-shirt?*
- *How did this activity change your perception of the environmental impact of the fashion supply chain? Are the final numbers concerning or are they acceptable?*
- *In what ways can understanding the journey of a white t-shirt influence your decisions as a professional in the fashion industry?*
- *How can these maths skills be useful in your role within the fashion industry, particularly in supply chain management?*
- *What aspects of the environmental consequences of fashion transportation surprised you the most?*
- *How might this activity impact your future decisions as a consumer?*
- *In what ways can professionals in the fashion industry contribute to reducing the environmental impact of clothing transportation?*
- *How can the insights gained from this activity be applied in your specific role within the fashion industry, whether as a designer, buyer, or supply chain manager?*

METHODOLOGY TIPS

- Incorporate real-world examples and case studies to illustrate the impact of fashion transportation on the environment.
- Encourage group discussions to facilitate the exchange of insights and perspectives.
- Utilise multimedia elements, such as visuals and infographics, to enhance understanding of the supply chain process.

TIPS FOR ONLINE

- Use online tools for collaborative calculations and discussions.
- Provide pre-recorded videos or animations to visually explain the supply chain and calculation process.
- Encourage learners to explore additional online resources to deepen their understanding of the environmental implications of fashion transportation.

4.5. Activity 5

NAME
ECO-MODULATE YOURSELF

LEARNING AIM
Learners will be familiar with the theoretical application of Extended Producer

Responsibility (EPR) in business practice. Learners will estimate EPR fees of fashion products based on five key Eco-modulation factors.

LEARNING OBJECTIVES

- Develop awareness of different phases of the fashion product consumption process.
- Analyse eco-modulation factors in relation to fashion products through awareness of Extended Producer Responsibility
- Identify reasons of why the fashion product consumption and afterlife became an alarming problem of the fashion industry.

LEVEL
Intermediate, some level of materials and production knowledge is needed.

LENGTH
1 hour.

TARGET GROUP
Adult learners working in various roles within the fashion industry, including designers, buyers, and supply chain managers.

MATERIALS

1. Catalogue of clothes with information about origin, materials used in products. certificates, etc.
2. Cards with definitions of Extended Producer Responsibility and key factors of Eco-modulation.
3. Paper.
4. Pen.
5.

INSTRUCTIONS
Learners will listen to or read the definition of Extended Producer Responsibility:

Fashion industry faces many problems related to huge environmental pollution and modern slavery in its supply chain. Extended Producer Responsibility is the next sustainable black in the fashion industry and should lead to waste reduction and environmental impact in general. Producer's responsibility for a product is legally extended to the post-consumer stage of a product's life cycle. In the fashion and apparel industry mass production might involve the creation of thousands or even tens of thousands of units of a particular clothing item. The exact quantity can depend on factors such as the size of the market, the production capacity

of the manufacturer, and the demand for the product. But the brands mostly don't care what happens to their clothes when it leaves the shelves in stores and heads into customers' wardrobes. Usable clothing is frequently perceived as outdated and unwearable in the global North just because of planned obsolescence caused by changing trends in fashion. The mass production also doesn't care about the poor quality of produced clothes. That both leads to overproduction and throwaway culture. Presently, a mere 22% of post-consumer textile waste in the EU undergoes separate collection for re-use or recycling, with the remaining portion frequently subjected to incineration or landfill disposal.

Because of extended producer responsibility textile manufacturers, including fashion brands and retailers, should cover the costs of management of textile waste. This arrangement aims to motivate them to minimise waste and promote the circularity of their products starting from the initial design phase. How much producers should pay to the EPR scheme will be adjusted based on the environmental performance of textiles, a principle known as 'eco-modulation'.

Learners will be asked following questions:

1. *What do you see as the biggest problem of the post-consumer phase of textile or garment lifecycle?*
2. *Do you consider the durability of your products the moment you are designing and producing your products? Why or why not?*
3. *What do you think are the influencing factors for the high EPR fee according to eco-modulation?*

Learners have catalogues of products with all the info. They will choose five different products from the catalogues. Then the whole group of learners discuss the potential high fees of chosen products according to the following five factors. All thoughts can be written on a paper.

Eco-modulation factors include:

1. <u>Environmental Impact</u>
   The overall environmental impact of the textile, considering factors like water and energy use, chemical usage, and carbon footprint. (for example linen has a lower impact than acryl).

2. <u>Use of Sustainable Materials</u>
   The proportion of sustainable or recycled materials used in the production of textiles (Certificates are needed).

3. Product Lifespan and Durability
   The durability and longevity of the products, encouraging the creation of items that last longer and contribute less to waste.

4. Recyclability
   The ease with which the textile can be recycled and incorporated into a circular economy.

5. End-of-Life Management
   Producers' efforts in facilitating proper disposal, recycling, or upcycling of their products at the end of their life cycle.

After 10 minutes of discussion learners rank all the five products from the lowest to the highest potential fee and write it down on paper.

REFLECTION
Learners are asked following questions:

- *For what specific piece should be paid the biggest EPR fee, for what the lowest? Why?*
- *What can you change about your products towards bigger sustainability and lower EPR fee? What do you think you can´t change in a short time?*
- *Do you think it would be better to have one unified fee and simplify that then calculate that fee according to eco-modulation principles? Why yes or why not*

LIST OF CARDS

DEFINITION OF EXTENDED PRODUCER RESPONSIBILITY:
Fashion industry faces many problems related to huge environmental pollution and modern slavery in its supply chain. Extended Producer Responsibility is the next sustainable black in the fashion industry and should lead to waste reduction and environmental impact in general. Producer's responsibility for a product is legally extended to the post-consumer stage of a product's life cycle. In the fashion and apparel industry mass production might involve the creation of thousands or even tens of thousands of units of a particular clothing item. The exact quantity can depend on factors such as the size of the market, the production capacity of the manufacturer, and the demand for the product. But the brands mostly don't care what happens to their clothes when it leaves the shelves in stores and heads into customers' wardrobes. Usable clothing is frequently

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ECO-MODULATION FACTOR #1: Environmental impact The overall environmental impact of the textile, considering factors like water and energy use, chemical usage, and carbon footprint (for example linen has a lower impact than acryl).
ECO-MODULATION FACTOR #2: Use of Sustainable Materials The proportion of sustainable or recycled materials used in the production of textiles (Certificates are needed)
ECO-MODULATION FACTOR #3: Product Lifespan and Durability The durability and longevity of the products, encouraging the creation of items that last longer and contribute less to waste.
ECO-MODULATION FACTOR #4: Recyclability The ease with which the textile can be recycled and incorporated into a circular economy.
ECO-MODULATION FACTOR #5: End-of-Life Management Producers' efforts in facilitating proper disposal, recycling, or upcycling of their products at the end of their life cycle.

METHODOLOGY TIPS

During this activity learners can also look online for necessary information which they miss to make the decision on the final ranking.

TIPS FOR ONLINE

Learners can use their online catalogues and cards uploaded on a shared presentation.

5. Assessments

5.1. Final Assessment

1. FTI stands for?
A) Fashion Transparency Institute
B) Fashion Transportation Index
C) Fashion Transportation Institute
D) Fashion Transparency Index

ANSWER: (D) Fashion Transparency Index

2. Which type of fashion supply chain aims to reduce waste by creating a closed-loop system?
A) Vertical supply chain
B) Circular supply chain
C) Linear supply chain
D) Traditional supply chain

ANSWER: (B) Circular supply chain

3. What is the term used to describe leftover fabric that can't be used for its original purpose, often coming from overproduction or cancelled orders?
A) Microfibers
B) Deadstock
C) Sustainable textiles
D) Recycled fibres

ANSWER: (B) Deadstock

4. Which one of the following options refers to tencel?
A) Symbiotic culture of bacteria and yeast
B) Seaweed mixed with wood pulps
C) Pineapple Leaf Fibre - agricultural waste product from pineapple plants
D) Eucalyptus plant - can grow on marginal lands which are not suitable for farming

ANSWER: (D) Eucalyptus plant - can grow on marginal lands which are not suitable for farming

5. Why do fashion retailers often destroy their unsold products?
A) To prevent counterfeit market sales
B) To reduce carbon emissions
C) To donate to charity
D) To avoid recycling costs

ANSWER: (A) To prevent counterfeit market sales

6. Which description of air transportation is correct?
A) Positive: long distances and a cheap price / Negative: most energy intensive
B) Positive: long distances and a energy efficiency / Negative: expensive
C) Positive: long distances / Negative: expensive and most energy intensive
D) Positive: cheap price / Negative: short distances and most energy intensive

ANSWER: (C) Positive: long distances / Negative: expensive and most energy intensive

7. Which option describes the most accurately the logical order of stages in the garment production process?
A) Design - Garment Sampling - Packing - Sales
B) Garment Sampling - Grading - Design - Sales
C) Design - Packing - Grading - Sales
D) Garment Sampling - Design - Packing - Sales

ANSWER: (A) Design - Garment Sampling - Packing - Sales

8. Depending on types of demand and supply, supply chain can be divided as?
A) low, Fast, Ultra-fast
B) Push & Pull
C) Local, Global, Mixed Local & Global
D) Local, Global

ANSWER: (B) Push & Pull

9. WHAT IS EPR?
A) Stands for extended purchase responsibility - an environmental policy approach in which a consumer's responsibility for a product is extended to the post-consumer stage of a product's life cycle

B) Stands for extended purchase responsibility - an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle
C) Stands for extended producer responsibility - an environmental policy approach in which a consumer's responsibility for a product is extended to the post-consumer stage of a product's life cycle
D) Stands for extended producer responsibility - an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle

ANSWER: (D) Stands for extended producer responsibility - an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle.

10. Which one of the following options describes - transparency - most accurately:
A) is the ability to discover information about where and how a product was made
B) the involvement of new fashion transparency technologies
C) is a situation in which business and its financial activities are done in an open way without secrets, so that people can trust that they are fair and honest
D) tracking the movement of goods and ensures that they come from ethical sources

ANSWER: (C) is a situation in which business and its financial activities are done in an open way without secrets, so that people can trust that they are fair and honest

6. Resources

1. Fashion Revolution: A global movement that campaigns for a more transparent and ethical fashion industry. It provides resources and information on supply chain practices.

2. Sustainable Apparel Coalition: An industry-wide group working to reduce the environmental and social impacts of apparel and footwear products around the world.

3. Circular Fashion Summit: Focuses on circular fashion and sustainable practices within the industry. It offers insights into circular economy concepts.

4. Textile Exchange: A global nonprofit organisation that works to accelerate sustainable practices in the textile industry. It provides reports, standards, and resources.

5. Fashion for Good: A platform that inspires and helps fashion brands to adopt sustainable and circular practices. It offers resources, innovation programs, and insights.

6. Sustainable Fashion Forum: An online community and resource hub for sustainable fashion. It provides information on sustainable practices and connects industry professionals.

7. Ellen MacArthur Foundation - Make Fashion Circular: An initiative that promotes the circular economy in the fashion industry. It offers reports, guides, and case studies.

8. Good On You - Ethical Fashion Guide: A platform that rates fashion brands based on their ethical and sustainable practices. It helps consumers make informed choices.

9. Remake: A community and platform that educates consumers about the fashion industry's impact and advocates for a more sustainable approach.

10. Common Objective: A platform that connects and supports professionals in the fashion industry interested in sustainability. It offers resources, articles, and networking opportunities.

11. Fashion Retail Logistics Hub: A platform providing insights into logistics and transportation solutions for the fashion and retail sector.

12. Journal of Fashion Marketing and Management: This academic journal often publishes research articles on various aspects of the fashion supply chain, including distribution and transportation.

13. International Journal of Physical Distribution & Logistics Management: This journal covers topics related to physical distribution and logistics management, offering relevant research articles.

14. Transport Intelligence - Fashion Logistics: Transport Intelligence provides market research and insights into logistics in the fashion and apparel sector.

15. The Loadstar - Fashion Logistics: The Loadstar offers news and analysis on global logistics, including specific coverage of logistics challenges in the fashion industry.

16. Fashion United - Logistics: Fashion United's logistics section provides news and articles on logistics trends and challenges within the fashion supply chain.

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