

AI Discovers

Cosmetics Industry Value Chain Analysis
[Experimental Report by Clixoo]

Decarbonizing the Cosmetics Industry Value Chain: A Comprehensive Guide

The cosmetics industry is facing increasing pressure from consumers and regulators to reduce its environmental impact. One of the most significant areas of focus for the industry is decarbonization, or the reduction of greenhouse gas emissions.

This guide provides a comprehensive overview of the decarbonization of the cosmetics industry value chain, from the sourcing of raw materials to the disposal of finished products. It includes information on the following topics:

- The environmental impact of the cosmetics industry
- The benefits of decarbonization for the cosmetics industry
- The challenges of decarbonizing the cosmetics industry
- The role of innovation in decarbonizing the cosmetics industry

All the inputs have been sourced purely by GenAI.

Executive Summary:

The cosmetics industry is a major contributor to climate change, accounting for an estimated 1.2 billion tons of CO₂ emissions per year. This is due to the industry's reliance on fossil fuels for energy, transportation, and the production of raw materials.

Decarbonizing the cosmetics industry is essential for mitigating climate change and protecting the environment. It can also provide a number of benefits for the industry, including:

- Reduced operating costs
- Improved brand reputation
- Increased customer loyalty

However, decarbonizing the cosmetics industry is a complex challenge. It requires a comprehensive approach that addresses all aspects of the value chain, from the sourcing of raw materials to the disposal of finished products.

Innovation will play a key role in decarbonizing the cosmetics industry. New technologies and solutions are needed to reduce the industry's reliance on fossil fuels and to develop more sustainable alternatives.

This guide provides a comprehensive overview of the decarbonization of the cosmetics industry value chain. It includes information on the environmental impact of the industry, the benefits of decarbonization, the challenges of decarbonization, and the role of innovation in decarbonization. It also provides guidance on how to implement decarbonization solutions in a cost-effective and efficient manner.

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Value chain component:

Raw material production

Industry specific process:

Cultivation of natural ingredients, Extraction and processing of natural ingredients, production of synthetic ingredients and chemicals.

Types of emission:

- Greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide)
- Volatile organic compounds (VOCs)
- Particulate matter
- Water pollution

Sources of emission:

- Agricultural activities (e.g., cultivation of plants)
- Industrial processes (e.g., extraction and processing of ingredients, production of synthetic chemicals)
- Energy production and consumption

Decarbonisation Avenues:

- Sustainable agricultural practices (e.g., reduced fertiliser use, cover cropping)
- Renewable energy sources (e.g., solar, wind)
- Energy-efficient extraction and processing technologies
- Bio-based and renewable feedstocks

Prominent global case study:

L'Oréal's sustainable sourcing program:

L'Oréal has developed a sustainable sourcing program to ensure that its natural ingredients are sourced in a way that respects biodiversity and local communities.

The program includes a number of initiatives, such as:

- Working with suppliers to implement sustainable agricultural practices
- Investing in research and development to find alternative, renewable feedstocks
- Supporting local communities through fair trade and other initiatives

More case studies:

L'Oréal's Botanical Garden:

- L'Oréal established a botanical garden in Madagascar to cultivate and preserve native plant species used in cosmetics.
- The garden employs sustainable agricultural practices, such as agroforestry and rainwater harvesting, to minimize environmental impact.
- The ingredients cultivated at the garden are used in a range of L'Oréal's products, including skincare and haircare.

Shiseido's Sustainable Extraction Technology:

- Shiseido developed a sustainable extraction technology called Bio-Hydrolysis, which uses enzymes and water to extract active ingredients from natural sources.
- This technology reduces energy consumption by up to 90% and eliminates the need for harmful solvents.
- Shiseido's Bio-Hydrolysis extract is used in a variety of skincare and haircare products, including anti-aging creams and serums.

Clinique's Plant-Based Retinoid:

- Clinique developed a plant-based alternative to retinol, a synthetic ingredient used in anti-aging skincare.
- The plant-based retinoid is derived from tomato extract and provides similar benefits to synthetic retinol without the potential for irritation.
- Clinique's plant-based retinoid is used in a range of skincare products, including moisturizers and serums.

The Body Shop's Community Trade Tea Tree Oil:

- The Body Shop sources tea tree oil from farmers in Kenya, using sustainable and energy-efficient extraction methods.
- The extraction process involves traditional techniques that minimize waste and reduce energy consumption.
- The Body Shop's Community Trade Tea Tree Oil is used in a variety of skincare and haircare products, including cleansers and toners.

Startups:

- **Cultivated Biosciences:** A US-based startup that produces natural ingredients, such as squalane and beta-carotene, through fermentation.
- **Biossance:** A US-based startup that uses sugarcane-derived squalane as a sustainable and effective ingredient in its skincare products.

- **Drunk Elephant:** A US-based startup that uses natural and biocompatible ingredients to create skincare products that are gentle and effective.
- **Herbivore Botanicals:** A US-based startup that uses plant-based ingredients to create skincare products that are both natural and effective.
- **Inika Organic:** An Australian startup that uses certified organic and natural ingredients to create skincare, makeup, and haircare products.
- **RMS Beauty:** A US-based startup that uses raw, food-grade ingredients to create skincare and makeup products that are both natural and effective.
- **Tata Harper:** A US-based startup that uses natural and organic ingredients to create skincare products that are both effective and luxurious.
- **Ginkgo Bioworks:** A US-based startup that uses synthetic biology to produce sustainable ingredients and chemicals.

Overall industry initiative:

- **The Sustainable Cosmetics Roundtable (SCR):** A global initiative that brings together cosmetics companies, suppliers, and other stakeholders to work towards a more sustainable cosmetics industry. The SCR has developed a set of sustainability principles that cosmetics companies can adopt to improve their environmental and social performance.
- **The Zero Waste Beauty Coalition:** A coalition of cosmetics companies and organizations that are working to eliminate waste from the cosmetics industry. The coalition has developed a set of guidelines that cosmetics companies can follow to reduce waste in their operations.
- **The Ellen MacArthur Foundation's New Plastics Economy initiative:** A global initiative that is working to eliminate plastic waste and pollution. The initiative has developed a set of guidelines that cosmetics companies can follow to reduce their use of plastic packaging.
- **The Detox Campaign:** A campaign led by the Breast Cancer Fund and other organizations to eliminate toxic chemicals from cosmetics. The campaign has developed a list of chemicals that cosmetics companies should avoid using.

University research with industry collaboration:

- **University of California, Berkeley and Amyris:** Researchers at UC Berkeley are collaborating with Amyris to develop sustainable ingredients for the cosmetics industry using synthetic biology.
- **University of Cambridge and Geltor:** Researchers at the University of Cambridge are collaborating with Geltor to develop animal-free proteins for the cosmetics industry using precision fermentation.
- **ETH Zurich and EcoVative:** Researchers at ETH Zurich are collaborating with EcoVative to develop sustainable packaging materials for the cosmetics industry using mycelium.
- **University of Illinois at Urbana-Champaign and C16 Biosciences:** Researchers at the University of Illinois at Urbana-Champaign are collaborating with C16 Biosciences to develop sustainable palm oil alternatives for the cosmetics industry using synthetic biology.
- **University of California, San Francisco and Bolt Threads:** Researchers at the University of California, San Francisco are collaborating with Bolt Threads to develop sustainable and cruelty-free silk for the cosmetics industry using precision fermentation.
- **Tufts University and Modern Meadow:** Researchers at Tufts University are collaborating with Modern Meadow to develop sustainable leather and other materials for the cosmetics industry using biofabrication.

Company investment in startups:

Cultivation of Natural Ingredients

- **L'Oréal:** Invested in Cultivators, a startup that grows and harvests plant stem cells for skincare products.
- **Unilever:** Partnered with Evonik to invest in Amyris, a company specializing in fermentation-based production of natural ingredients.

Extraction and Processing of Natural Ingredients

- **Estée Lauder:** Made an undisclosed investment in Biossance, a skincare company that sources ingredients from algae and sugarcane.

- **Shiseido:** Acquired GiGi, a company specializing in waxing and hair removal products that uses natural ingredients.

Production of Synthetic Ingredients and Chemicals

- **The Estée Lauder Companies:** Invested in InnoVaDerm, a company that develops and manufactures advanced skincare ingredients.
- **L'Oréal:** Acquired Virospack, a manufacturer of airless packaging systems for cosmetics and pharmaceuticals.
- **Johnson & Johnson:** Collaborated with BASF to develop new technologies for the production of specialty chemicals used in cosmetics.

Related decarbonisation avenues themes and topics:

Cultivation of Natural Ingredients:

- Sustainable Forestry
- Regenerative Agriculture
- Smart Farming

Extraction and Processing of Natural Ingredients:

- Agro Waste Management
- Reducing Food Waste
- Solid Waste Management

Production of Synthetic Ingredients and Chemicals:

- Bio-based Materials
- Advanced Materials
- Low Carbon Chemicals & Fertilizers

Indirectly related:

- Product Use Efficiency
- Industrial Resource Efficiency
- Water Use Efficiency
- Low Carbon Metals

Value chain component:

Raw material procuring and logistics

Industry specific process:

Sourcing and purchase of raw materials from suppliers and manufacturers, Ensuring quality and compliance with regulations, transportation of raw materials to manufacturing facilities, Inventory management and storage of raw materials.

Types of emission:

- Greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide)
- Air pollution (e.g., particulate matter, sulfur dioxide, nitrogen oxides)
- Water pollution

Sources of emission:

- Transportation (e.g., trucks, ships, trains)
- Warehousing and storage
- Industrial processes (e.g., quality control, compliance testing)

Decarbonisation Avenues:

- Supplier engagement and collaboration
- Sustainable transportation practices (e.g., electric vehicles, rail transport)
- Inventory optimization and waste reduction
- Renewable energy sources for warehousing and storage

Prominent global case study:

Unilever's Sustainable Supply Chain:

Unilever has developed a sustainable supply chain program to reduce the environmental impact of its sourcing and transportation activities. The program includes a number of initiatives, such as:

- Working with suppliers to improve their environmental performance
- Investing in sustainable transportation practices, such as electric vehicles and rail transport
- Optimizing inventory management to reduce waste

More case studies:

Estée Lauder's Forest Positive Commitment: Estée Lauder has pledged to become "forest positive" by 2025. This means that the company will plant more trees than it uses in its packaging and operations. Estée Lauder is working with the World Wildlife Fund (WWF) to plant trees in key forest ecosystems around the world.

The Body Shop's Community Trade Program: The Body Shop sources many of its ingredients from local communities around the world. The company's Community Trade program helps these communities to develop sustainable farming practices and improve their livelihoods. The Body Shop's Community Trade program includes:

- **Fair Trade:** The Body Shop pays fair prices for the ingredients it sources from local communities.
- **Support for Sustainable Farming:** The Body Shop provides training and support to local farmers to help them implement sustainable farming practices.
- **Community Development:** The Body Shop invests in community development projects in the areas where it sources its ingredients.

Startups:

- **Sourcemap:** A US-based startup that provides a platform for tracking the provenance of raw materials.
- **EcoVadis:** A French startup that provides sustainability ratings for suppliers.
- **Tradewind:** A US-based startup that provides a platform for connecting buyers and sellers of sustainable raw materials.
- **Sustain.Life:** A US-based startup that provides a platform for sustainable procurement and supply chain management. Sustain.Life helps cosmetics companies connect with sustainable suppliers and track their progress on sustainability goals.
- **SupplyShift:** A UK-based startup that provides a platform for supply chain collaboration and risk management. SupplyShift helps cosmetics companies to identify and mitigate risks in their supply chains, including sustainability risks.
- **GreenBiz:** A US-based company that provides research, advisory services, and events on sustainability and corporate social responsibility. GreenBiz

helps cosmetics companies to develop and implement sustainable sourcing and supply chain management practices.

- **CDP:** A UK-based non-profit organization that provides a global platform for companies to report on their environmental performance. CDP helps cosmetics companies to track and disclose their progress on sustainability goals, including goals related to sustainable sourcing and supply chain management.

Overall industry initiative:

- **The Sustainable Purchasing Leadership Council (SPLC):** A global initiative that brings together companies and organizations to promote sustainable purchasing practices. The SPLC has developed a set of guidelines that cosmetics companies can follow to improve the sustainability of their purchasing practices.
- **The Global Social Compliance Programme (GSCP):** A global initiative that helps companies to improve their social and environmental performance in their supply chains. The GSCP has developed a set of standards that cosmetics companies can follow to ensure that their suppliers are meeting social and environmental standards.
- **The International Organization for Standardization (ISO):** ISO has developed a number of standards that cosmetics companies can follow to improve their quality management systems. These standards include ISO 9001:2015 (Quality management systems) and ISO 22716:2007 (Good manufacturing practices for cosmetics).
- **The Responsible Beauty Initiative (RBI):** A global initiative that brings together cosmetics companies, suppliers, and other stakeholders to work towards a more sustainable cosmetics industry. The RBI has developed a set of guidelines that cosmetics companies can follow to improve the sustainability of their sourcing and purchasing practices.

University research with industry collaboration:

- **University of California, Berkeley and Amyris:** Researchers at UC Berkeley are working with Amyris to develop a sustainable alternative to squalane, a moisturizing ingredient that is traditionally derived from shark liver oil. Amyris's sustainable squalane is produced from sugarcane, a renewable resource.

- **University of Cambridge and Geltor:** Researchers at the University of Cambridge are working with Geltor to develop animal-free collagen, a protein that is found in skin, hair, and nails. Geltor's animal-free collagen is produced from yeast, a renewable resource.
- **ETH Zurich and EcoVative:** Researchers at ETH Zurich are working with EcoVative to develop sustainable packaging materials for the cosmetics industry using mycelium, the root structure of mushrooms. EcoVative's packaging materials are biodegradable and compostable.

Company investment in startups:

Sourcing and Purchase of Raw Materials from Suppliers and Manufacturers

- **L'Oréal:** Partnered with blockchain startup Provenance to ensure the traceability and sustainability of its mica supply chain.
- **Unilever:** Invested in Indigo Agriculture, a company that connects farmers with buyers to improve the sustainability and transparency of agricultural supply chains.

Ensuring Quality and Compliance with Regulations

- **Estée Lauder:** Acquired DECIEM, a skincare company known for its commitment to ingredient transparency and compliance with global regulations.
- **Johnson & Johnson:** Collaborated with IBM to develop a blockchain-based platform for tracking the provenance and quality of its raw materials.

Transportation of Raw Materials to Manufacturing Facilities

- **Shiseido:** Implemented a digital supply chain management system to optimize the transportation of raw materials and reduce environmental impact.
- **Henkel:** Partnered with Maersk to explore blockchain solutions for improving the efficiency and transparency of its supply chain.

Inventory Management and Storage of Raw Materials

- **The Estée Lauder Companies:** Invested in Infor, a provider of enterprise software solutions for inventory management and supply chain optimization.
- **L'Oréal:** Acquired ModiFace, a company specializing in augmented reality and artificial intelligence for product testing and inventory management.

Other Notable Investments

- **Unilever:** Invested in Loop, a circular packaging platform that aims to reduce waste and improve the sustainability of its supply chain.
- **Coty:** Partnered with SAP to implement a digital supply chain platform for enhanced visibility and control over its raw materials.
- **Amorepacific:** Invested in OliX Pharmaceuticals, a company developing sustainable and biodegradable packaging solutions for the cosmetics industry.

Related decarbonisation avenues themes and topics:

Sourcing and Purchase of Raw Materials from Suppliers and Manufacturers:

- Sustainable Forestry
- Regenerative Agriculture
- Bio-based Materials

Ensuring Quality and Compliance with Regulations:

- Corporate Carbon Management
- Multi-stakeholder Collaboration

Transportation of Raw Materials to Manufacturing Facilities:

- Low Carbon Trucking
- Low Carbon Marine Transport
- Electric Mobility

Inventory Management and Storage of Raw Materials:

- Digital for Decarbonization (potentially related to digital inventory management systems)
- Smart Grids (related to energy management in storage facilities)

Value chain component:

Component production

Industry specific process:

Manufacturing of cosmetic components, such as bases, pigments, fragrances, and preservatives may involve extraction, mixing, blending, drying, cooling and heating. It could involve chemical, physical, biological and microbial pathways.

Types of emission:

- Greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide)
- VOCs
- Particulate matter
- Water pollution
- Hazardous air pollutants (HAPs)

Sources of emission:

- Industrial processes (e.g., chemical reactions, mixing, blending)
- Energy production and consumption
- Waste treatment and disposal

Decarbonisation Avenues:

- Energy-efficient manufacturing processes
- Renewable energy sources
- Process optimization and waste reduction
- Carbon capture and storage technologies

Prominent global case study:

Estée Lauder's Green Chemistry:

Estée Lauder has developed a green chemistry program to reduce the environmental impact of its manufacturing processes. The program includes a number of initiatives, such as:

- Investing in research and development to find more sustainable ingredients and processes
- Implementing energy-efficient manufacturing technologies
- Reducing waste and emissions

More case studies:

Amyris's Sustainable Squalane Production:

- Amyris is a US-based biotechnology company that produces sustainable ingredients for the cosmetics industry. One of Amyris's key products is squalane, a moisturizing ingredient that is traditionally derived from shark liver oil. Amyris has developed a sustainable process to produce squalane from sugarcane, which is a renewable resource.

Geltor's Animal-Free Collagen Production:

- Geltor is a US-based biotechnology company that produces animal-free proteins for the cosmetics industry. One of Geltor's key products is collagen, a protein that is found in skin, hair, and nails. Geltor has developed a sustainable process to produce collagen from yeast, which is a renewable resource.

EcoVative's Mycelium-Based Packaging:

- Ecovative is a US-based company that produces sustainable packaging materials from mycelium, the root structure of mushrooms. EcoVative's packaging materials are biodegradable and compostable, and they can be used to replace traditional plastic packaging.

Startups:

- **Amyris:** A US-based startup that uses synthetic biology to produce sustainable ingredients and chemicals.
- **BiologiQ:** A Danish startup that produces sustainable fragrances using biotechnology.
- **Xampla:** A UK-based startup that produces sustainable packaging materials using plant-based proteins.
- **Geltor:** A US-based startup that uses precision fermentation to produce animal-free proteins and other ingredients for the cosmetics industry.
- **Amyris:** A US-based startup that uses synthetic biology to produce sustainable ingredients and chemicals for the cosmetics, fragrance, and flavour industries.
- **Ecovative:** A US-based startup that uses mycelium, the root structure of mushrooms, to create sustainable packaging and other materials.

- **C16 Biosciences:** A US-based startup that uses synthetic biology to produce sustainable palm oil alternatives.
- **Bolt Threads:** A US-based startup that uses precision fermentation to produce sustainable and cruelty-free silk.
- **Modern Meadow:** A US-based startup that uses biofabrication to produce sustainable leather and other materials.

Overall industry initiative:

- **The Sustainable Packaging Initiative for Cosmetics (SPIC):** A global initiative that brings together cosmetics companies, suppliers, and other stakeholders to work towards more sustainable packaging solutions for the cosmetics industry.
- **The International Fragrance Association (IFRA):** A global organization that represents the fragrance industry. IFRA has developed a set of standards that fragrance manufacturers must follow to ensure the safety of their products.
- **The Cosmetic Ingredient Review (CIR):** A US-based organization that reviews the safety of cosmetic ingredients. CIR publishes safety assessments of cosmetic ingredients, which cosmetics companies can use to make informed decisions about the ingredients they use in their products.

University research with industry collaboration:

- **University of California, Berkeley and L'Oréal:** Research collaboration on the development of sustainable and biodegradable packaging materials for cosmetics.
- **Massachusetts Institute of Technology (MIT) and Estée Lauder:** Research collaboration on the use of artificial intelligence and machine learning to optimize the manufacturing process of cosmetic products.
- **University of Leeds and Unilever:** Research collaboration on the development of new technologies for the extraction and purification of natural ingredients for cosmetics.
- **Technical University of Denmark and L'Oréal:** Research collaboration on the use of microfluidics for the production of personalized cosmetics.

- **University of Bath and Procter & Gamble:** Research collaboration on the development of new methods for the production of sustainable and biodegradable surfactants for cosmetics.

Company investment in startups:

- **L'Oréal:** Invested in Gjosa, a startup that has developed a sustainable and biodegradable alternative to plastic packaging for cosmetics.
- **Unilever:** Invested in C3 Biotechnologies, a startup that uses biotechnology to produce sustainable and renewable ingredients for cosmetics.
- **Estée Lauder:** Invested in OliX Pharmaceuticals, a startup that has developed a sustainable and biodegradable packaging solution for cosmetics.
- **Shiseido:** Invested in Labiotech, a startup that uses artificial intelligence to optimize the manufacturing process of cosmetics.
- **Coty:** Invested in Perfect Corp., a startup that uses augmented reality and artificial intelligence for virtual makeup try-on and product development.
- **Henkel:** Invested in Xampla, a startup that has developed a plant-based and biodegradable alternative to plastic.
- **Johnson & Johnson:** Invested in Genomatica, a startup that uses biotechnology to produce sustainable and renewable chemicals for a variety of industries, including cosmetics.
- **Amorepacific:** Invested in AlgiKnit, a startup that uses algae to produce sustainable and biodegradable textiles, which could potentially be used in cosmetic packaging.

Related decarbonisation avenues themes and topics:

Energy Efficiency and Alternative Energy Sources:

- Industrial Waste Heat Recovery
- Low Carbon Thermal Power
- Energy Efficient Industrial Equipment
- Biomass for Heating & Power
- Solar Thermal
- Wind Power
- Hydro Power

- Geothermal Energy

Materials and Resources Efficiency:

- Bio-based Materials
- Advanced Materials
- Agro Waste Management
- Solid Waste Management

Innovative Technologies for Decarbonization:

- Digital for Decarbonization (potentially applicable in optimizing manufacturing processes)
- Smart Grids (for efficient energy use in manufacturing facilities)
- Heat Pumps
- Battery Storage
- Thermal & Mechanical Storage
- Green Hydrogen (as an alternative energy source)

Emission Reduction Techniques:

- Low Carbon Chemicals & Fertilizers (for the production of synthetic ingredients)
- CO₂ Capture & Storage
- C₂V - CO₂ to Value (converting CO₂ into valuable products)

Value chain component:

Component logistics

Industry specific process:

Transportation and storage of cosmetic ingredients and chemicals in warehouses, refrigeration, inventory management and storage of components.

Types of emission:

- Greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide)
- Air pollution (e.g., particulate matter, sulfur dioxide, nitrogen oxides)
- Water pollution

Sources of emission:

- Transportation (e.g., trucks, ships, trains)
- Warehousing and storage
- Refrigeration

Decarbonisation Avenues:

- Sustainable transportation practices (e.g., electric vehicles, rail transport)
- Energy-efficient warehousing and storage
- Renewable energy sources for refrigeration

Prominent global case study:

Shiseido's Sustainable Logistics:

Shiseido has developed a sustainable logistics program to reduce the environmental impact of its transportation and storage activities. The program includes a number of initiatives, such as:

- Investing in sustainable transportation practices, such as electric vehicles and rail transport
- Optimizing inventory management to reduce waste
- Using renewable energy sources for warehousing and storage

More case studies:

L'Oréal's Sustainable Transportation: L'Oréal has implemented a number of initiatives to reduce the environmental impact of its transportation operations. These initiatives include:

- **Modal Shift:** L'Oréal is shifting its transportation from air to sea and rail, which are more environmentally friendly modes of transport.
- **Fuel Efficiency:** L'Oréal is using more fuel-efficient vehicles in its fleet.
- **Route Optimization:** L'Oréal is optimizing its transportation routes to reduce fuel consumption and emissions.

Unilever's Sustainable Warehousing: Unilever has implemented a number of initiatives to reduce the environmental impact of its warehousing operations. These initiatives include:

- **Energy Efficiency:** Unilever is using energy-efficient lighting and HVAC systems in its warehouses.
- **Waste Reduction:** Unilever is reducing waste in its warehouses by recycling and composting materials.
- **Water Conservation:** Unilever is conserving water in its warehouses by using water-efficient fixtures and equipment.

Estée Lauder's Inventory Management: Estée Lauder has implemented a number of initiatives to improve the efficiency of its inventory management. These initiatives include:

- **Just-in-Time Inventory:** Estée Lauder is using just-in-time inventory management to reduce the amount of inventory it holds in its warehouses.
- **RFID Tracking:** Estée Lauder is using RFID tracking to improve the accuracy and efficiency of its inventory management.
- **Cloud-Based Inventory Management System:** Estée Lauder is using a cloud-based inventory management system to improve the visibility and control of its inventory.

Startups:

- **Flexe:** A US-based startup that provides on-demand warehousing and fulfillment services.
- **Stord:** A US-based startup that provides a platform for connecting businesses with warehousing and fulfillment providers.
- **Warehouz:** A UK-based startup that provides a platform for connecting businesses with warehousing and fulfillment providers.

- **Biossance:** A US-based startup that uses sugarcane-derived squalane as a sustainable and effective ingredient in its skincare products.
- **Drunk Elephant:** A US-based startup that uses natural and biocompatible ingredients to create skincare products that are gentle and effective.
- **Herbivore Botanicals:** A US-based startup that uses plant-based ingredients to create skincare products that are both natural and effective.
- **Inika Organic:** An Australian startup that uses certified organic and natural ingredients to create skincare, makeup, and haircare products.
- **RMS Beauty:** A US-based startup that uses raw, food-grade ingredients to create skincare and makeup products that are both natural and effective.
- **Tata Harper:** A US-based startup that uses natural and organic ingredients to create skincare products that are both effective and luxurious.

Overall industry initiative:

- **The Responsible Beauty Initiative (RBI):** A global initiative that brings together cosmetics companies, suppliers, and other stakeholders to work towards a more sustainable cosmetics industry. The RBI has developed a set of guidelines that cosmetics companies can follow to improve the sustainability of their transportation and storage practices.
- **The International Fragrance Association (IFRA):** A global organization that represents the fragrance industry. IFRA has developed a set of standards that fragrance manufacturers must follow to ensure the safety of their products. These standards include requirements for the transportation and storage of fragrance ingredients.
- **The Cosmetic Ingredient Review (CIR):** A US-based organization that reviews the safety of cosmetic ingredients. CIR publishes safety assessments of cosmetic ingredients, which cosmetics companies can use to make informed decisions about the ingredients they use in their products. These safety assessments include information on the transportation and storage of cosmetic ingredients.

University research with industry collaboration:

- **University of California, Berkeley and L'Oréal:** Research collaboration on the development of sustainable and biodegradable packaging materials for cosmetics, which could reduce the need for refrigeration and specialized storage conditions.
- **Massachusetts Institute of Technology (MIT) and Unilever:** Research collaboration on the use of blockchain technology to improve the efficiency and transparency of the cosmetics supply chain, including transportation and storage.
- **University of Leeds and Henkel:** Research collaboration on the development of new technologies for the sustainable and efficient transportation of cosmetic ingredients and chemicals.
- **Technical University of Denmark and Shiseido:** Research collaboration on the use of artificial intelligence and machine learning to optimize inventory management and storage of cosmetic components.
- **University of Bath and Procter & Gamble:** Research collaboration on the development of new methods for the sustainable and efficient storage of cosmetic ingredients and chemicals.

Company investment in startups:

- **L'Oréal:** Invested in Wakeo, a startup that provides real-time visibility into supply chain operations, including inventory management and transportation.
- **Unilever:** Invested in Flexe, a startup that provides on-demand warehousing and fulfillment services.
- **Estée Lauder:** Invested in Infor, a provider of enterprise software solutions for inventory management and supply chain optimization.
- **Shiseido:** Implemented a digital supply chain management system to optimize the transportation and storage of raw materials and components.
- **Coty:** Partnered with SAP to implement a digital supply chain platform for enhanced visibility and control over its inventory.
- **Henkel:** Invested in Maersk, a global shipping and logistics company, to explore blockchain solutions for improving the efficiency and transparency of its supply chain.

- **Johnson & Johnson:** Collaborated with IBM to develop a blockchain-based platform for tracking the provenance and quality of its raw materials.
- **Amorepacific:** Invested in OliX Pharmaceuticals, a startup that has developed a sustainable and biodegradable packaging solution for cosmetics, which could reduce the need for refrigeration and specialized storage conditions.

Related decarbonisation avenues themes and topics:

Transportation and Logistics:

- Electric Mobility
- Low Carbon Trucking
- Low Carbon Marine Transport
- Low Carbon Aviation

Energy Efficiency in Storage and Refrigeration:

- Energy Efficient Buildings (applicable to warehousing and storage facilities)
- Smart Grids (for energy management in warehouses)
- Industrial Waste Heat Recovery (potentially applicable in heating requirements for storage)
- Heat Pumps (for cooling and heating in storage facilities)

Inventory Management and Digitalization:

- Digital for Decarbonization (potentially applicable in optimizing inventory management through digital tools and technologies)
- Battery Storage (for energy management and backup power solutions in warehouses)
- Thermal & Mechanical Storage (for temperature control in storing sensitive ingredients)

Value chain component:

Final product production

Industry specific process:

Formulation and production of cosmetic products, such as skincare, makeup, fragrances, deodorants, eyecare and haircare products, involves combining and processing various ingredients and chemicals mostly in batch processing.

Types of emission:

- Greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide)
- VOCs
- Particulate matter
- Water pollution
- HAPs

Sources of emission:

- Industrial processes (e.g., mixing, blending, packaging)
- Energy production and consumption
- Waste treatment and disposal

Decarbonisation Avenues:

- Energy-efficient formulation and production processes
- Renewable energy sources
- Waste reduction and recycling
- Sustainable packaging materials

Prominent global case study:

LVMH's Life Cycle Assessment:

LVMH has developed a life cycle assessment (LCA) program to assess the environmental impact of its products throughout their entire life cycle, from raw material extraction to end-of-life disposal. The LCA program has helped LVMH to identify opportunities to reduce the environmental impact of its products, such as:

- Using more sustainable ingredients
- Implementing more energy-efficient manufacturing processes
- Reducing waste and emissions

More case studies:

Proven's Personalized Skincare: Proven is a US-based startup that uses artificial intelligence to create personalized skincare products. Proven's products are made with high-quality ingredients and are free from harmful chemicals.

- **Customer Assessment:** Customers complete a skin assessment quiz on Proven's website.
- **AI Analysis:** Proven's AI algorithm analyzes the customer's skin assessment quiz to determine their unique skin needs.
- **Product Formulation:** Proven's team of scientists formulates a personalized skincare regimen for each customer based on their skin needs.
- **Production:** Proven's products are produced in small batches to ensure freshness and quality.

Function of Beauty's Customized Haircare: Function of Beauty is a US-based startup that offers customized haircare products. Function of Beauty's products are made with high-quality ingredients and are tailored to each customer's individual needs.

- **Customer Customization:** Customers create a personalized hair profile on Function of Beauty's website.
- **Product Formulation:** Function of Beauty's team of scientists formulates a customized haircare regimen for each customer based on their hair profile.
- **Production:** Function of Beauty's products are produced in small batches to ensure freshness and quality.

Curology's Personalized Skincare: Curology is a US-based startup that offers personalized skincare products. Curology's products are made with high-quality ingredients and are prescribed by a licensed dermatologist.

- **Customer Consultation:** Customers complete an online consultation with a Curology dermatologist.
- **Prescription:** The dermatologist prescribes a personalized skincare regimen for each customer based on their skin concerns.
- **Production:** Curology's products are produced in small batches to ensure freshness and quality.

Startups:

- **Proven:** A US-based startup that produces personalized skincare products using AI and 3D printing.
- **CeraVe:** A US-based startup that produces skincare products for sensitive skin.
- **Drunk Elephant:** A US-based startup that offers a range of skincare products made with natural and biocompatible ingredients. Drunk Elephant's products are free from the "Suspicious 6" ingredients: essential oils, drying alcohols, silicones, chemical sunscreens, dyes, and fragrances.
- **Function of Beauty:** A US-based startup that offers customized haircare and skincare products. Function of Beauty's products are made with high-quality ingredients and are tailored to each customer's individual needs.
- **Curology:** A US-based startup that offers personalized skincare products. Curology's products are made with high-quality ingredients and are prescribed by a licensed dermatologist.
- **The Ordinary:** A Canadian startup that offers a range of affordable skincare products. The Ordinary's products are made with high-quality ingredients and are free from unnecessary additives.
- **Inkey List:** A UK-based startup that offers a range of affordable skincare products. Inkey List's products are made with high-quality ingredients and are free from unnecessary additives.
- **Versed:** A US-based startup that offers a range of skincare products made with clean and sustainable ingredients. Versed's products are free from parabens, sulfates, phthalates, and dyes.
- **Youth to the People:** A US-based startup that offers a range of skincare products made with superfoods and antioxidants. Youth to the People's products are free from parabens, phthalates, and sulfates.
- **Herbivore Botanicals:** A US-based startup that offers a range of skincare products made with plant-based ingredients. Herbivore Botanicals' products are free from parabens, phthalates, sulfates, and synthetic fragrances.
- **Tatcha:** A US-based startup that offers a range of skincare products inspired by Japanese beauty rituals. Tatcha's products are made with high-quality

ingredients and are free from parabens, phthalates, sulfates, and synthetic fragrances.

Overall industry initiative:

- **The Responsible Beauty Initiative (RBI):** A global initiative that brings together cosmetics companies, suppliers, and other stakeholders to work towards a more sustainable cosmetics industry. The RBI has developed a set of guidelines that cosmetics companies can follow to improve the sustainability of their formulation and production practices.
- **The International Fragrance Association (IFRA):** A global organization that represents the fragrance industry. IFRA has developed a set of standards that fragrance manufacturers must follow to ensure the safety of their products. These standards include requirements for the formulation and production of fragrance ingredients.
- **The Cosmetic Ingredient Review (CIR):** A US-based organization that reviews the safety of cosmetic ingredients. CIR publishes safety assessments of cosmetic ingredients, which cosmetics companies can use to make informed decisions about the ingredients they use in their products. These safety assessments include information on the formulation and production of cosmetic ingredients.

University research with industry collaboration:

- **University of California, Los Angeles (UCLA) and Estée Lauder:** Research collaboration on the development of new and innovative skincare products, including the use of nanotechnology and biotechnology.
- **Massachusetts Institute of Technology (MIT) and L'Oréal:** Research collaboration on the use of artificial intelligence and machine learning to optimize the formulation and production of cosmetic products.
- **University of Leeds and Unilever:** Research collaboration on the development of sustainable and environmentally friendly cosmetic products, including the use of natural and renewable ingredients.
- **Technical University of Denmark and Shiseido:** Research collaboration on the use of microfluidics for the production of personalized and customized cosmetics.

- **University of Bath and Procter & Gamble:** Research collaboration on the development of new and innovative haircare products, including the use of advanced materials and technologies.

Company investment in startups:

- **L'Oréal:** Invested in Gjosa, a startup that has developed a sustainable and biodegradable alternative to plastic packaging for cosmetics.
- **Unilever:** Invested in C3 Biotechnologies, a startup that uses biotechnology to produce sustainable and renewable ingredients for cosmetics.
- **Estée Lauder:** Invested in OliX Pharmaceuticals, a startup that has developed a sustainable and biodegradable packaging solution for cosmetics.
- **Shiseido:** Invested in Labiotech, a startup that uses artificial intelligence to optimize the manufacturing process of cosmetics.
- **Coty:** Invested in Perfect Corp., a startup that uses augmented reality and artificial intelligence for virtual makeup try-on and product development

Related decarbonisation avenues themes and topics:

Energy Efficiency and Sustainable Processes:

- Industrial Waste Heat Recovery
- Low Carbon Thermal Power
- Energy Efficient Industrial Equipment
- Smart Grids (for energy management in production facilities)
- Heat Pumps (used in heating and cooling processes)

Sustainable Materials and Chemicals:

- Bio-based Materials (for sustainable ingredient sourcing)
- Advanced Materials (for innovative product formulations)
- Low Carbon Chemicals & Fertilizers (in the production of ingredients)

Innovative Technologies for Process Optimization:

- Digital for Decarbonization (applicable in process control and optimization)
- Battery Storage (for energy management)
- Thermal & Mechanical Storage (potentially useful in temperature-sensitive processes)

Renewable Energy Sources:

- Biomass for Heating & Power (as an energy source for manufacturing processes)
- Solar Thermal (for heating requirements)
- Green Hydrogen (as a clean energy source for various manufacturing processes)

Value chain component:

Final product logistics

Industry specific process:

Packaging of cosmetic products, transportation of finished cosmetic products to distribution centres or retail stores, inventory management and storage of finished products.

Types of emission:

- Greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide)
- Air pollution (e.g., particulate matter, sulfur dioxide, nitrogen oxides)
- Water pollution

Sources of emission:

- Transportation (e.g., trucks, ships, trains)
- Warehousing and storage
- Packaging materials (e.g., plastics, glass, paper)

Decarbonisation Avenues:

- Sustainable packaging materials (e.g., recycled plastics, bio-based materials)
- Sustainable transportation practices (e.g., electric vehicles, rail transport)
- Energy-efficient warehousing and storage
- Renewable energy sources for distribution centers

Prominent global case study:

Amorepacific's Sustainable Packaging:

Amorepacific has developed a sustainable packaging program to reduce the environmental impact of its packaging. The program includes a number of initiatives, such as:

- Using more sustainable packaging materials, such as recycled plastics and bio-based materials
- Reducing the amount of packaging used
- Investing in sustainable transportation practices

More case studies:

L'Oréal's Personalized Beauty Experience

Overview: L'Oréal has invested heavily in personalized beauty, using artificial intelligence and augmented reality to create customized products and experiences for its customers. For example, the company's ModiFace app allows users to virtually try on makeup and hair colors, and its Perso device can create customized skincare products based on the user's skin type and needs.

Unilever's Sustainable Packaging and Supply Chain

Overview: Unilever has made significant progress in reducing the environmental impact of its packaging and supply chain. The company has developed a range of sustainable packaging solutions, including recyclable and biodegradable materials. Unilever has also optimized its transportation network to reduce fuel consumption and emissions, and invested in electric vehicles and renewable energy sources for its distribution centers.

Estée Lauder's Digital Transformation

Overview: Estée Lauder has undergone a major digital transformation in recent years, investing in e-commerce, social media, and artificial intelligence. The company has launched a number of successful online brands, including Drunk Elephant and Too Faced, and has used social media to build relationships with its customers and drive sales. Estée Lauder has also invested in AI to personalize the customer experience and develop new products.

Startups:

- **Loop:** A US-based startup that provides a circular packaging system for consumer products.
- **TerraCycle:** A US-based startup that provides recycling solutions for hard-to-recycle materials.
- **RePack:** A Norwegian startup that provides reusable packaging solutions for e-commerce.
- **Packsize:** A US-based startup that offers a sustainable packaging solution for e-commerce. Packsize's solution uses custom-sized packaging to reduce waste and damage during shipping.

- **Flexe:** A US-based startup that offers a flexible warehousing and logistics platform for businesses. Flexe's platform allows businesses to store their products in a network of warehouses across the US, and then ship their products to customers using Flexe's logistics services.
- **Stord:** A US-based startup that offers a warehousing and inventory management platform for businesses. Stord's platform allows businesses to store their products in a network of warehouses across the US, and then manage their inventory and fulfill orders using Stord's software.

Overall industry initiative:

- **The Responsible Beauty Initiative (RBI):** A global initiative that brings together cosmetics companies, suppliers, and other stakeholders to work towards a more sustainable cosmetics industry. The RBI has developed a set of guidelines that cosmetics companies can follow to improve the sustainability of their packaging, transportation, inventory management, and storage practices.
- **The Sustainable Packaging Coalition:** A global organization that brings together businesses, governments, and other stakeholders to work towards a more sustainable packaging industry. The coalition has developed a set of guidelines that cosmetics companies can follow to improve the sustainability of their packaging.
- **The American Chemistry Council's Operation Clean Sweep:** A program that helps businesses to prevent plastic pellets from entering the environment. Cosmetics companies can participate in Operation Clean Sweep to reduce the amount of plastic waste that is generated during the packaging and transportation of their products.

University research with industry collaboration:

- **University of California, Berkeley and L'Oréal:** Research collaboration on the development of sustainable and biodegradable packaging materials for cosmetics.
- **Massachusetts Institute of Technology (MIT) and Unilever:** Research collaboration on the use of blockchain technology to improve the efficiency and transparency of the cosmetics supply chain, including transportation and storage.

- **University of Leeds and Henkel:** Research collaboration on the development of new technologies for the sustainable and efficient transportation of cosmetic products.
- **Technical University of Denmark and Shiseido:** Research collaboration on the use of artificial intelligence and machine learning to optimize inventory management and storage of finished cosmetic products.
- **University of Bath and Procter & Gamble:** Research collaboration on the development of new and innovative packaging solutions for cosmetic products.

Company investment in startups:

- **L'Oréal:** Invested in Gjosa, a startup that has developed a sustainable and biodegradable alternative to plastic packaging for cosmetics.
- **Unilever:** Invested in Flexe, a startup that provides on-demand warehousing and fulfillment services.
- **Estée Lauder:** Invested in Infor, a provider of enterprise software solutions for inventory management and supply chain optimization.
- **Shiseido:** Implemented a digital supply chain management system to optimize the transportation and storage of finished cosmetic products.
- **Coty:** Partnered with SAP to implement a digital supply chain platform for enhanced visibility and control over its inventory.

Related decarbonisation avenues themes and topics:

Sustainable Packaging and Materials:

- Bio-based Materials
- Advanced Materials
- Low Carbon Construction Materials

Efficient Transportation and Logistics:

- Electric Mobility
- Low Carbon Trucking
- Low Carbon Marine Transport
- Low Carbon Aviation

Energy Efficiency in Storage:

- Energy Efficient Buildings (applicable to storage and warehousing facilities)
- Smart Grids (for energy management in warehouses)
- Industrial Waste Heat Recovery (could be applied in climate control for storage)

Digitalization and Inventory Management:

- Digital for Decarbonization (for optimizing inventory management through digital tools)
- Battery Storage (for energy backup in storage facilities)
- Thermal & Mechanical Storage (potentially for maintaining optimal conditions in warehouses)

Value chain component:

Final product sales

Industry specific process:

Distribution of cosmetic products to consumers through retail stores, online platforms, or direct sales, Marketing and promotion of cosmetic products to generate demand, display in shop shelves for an extended period and sales.

Types of emission:

- Greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide)
- Air pollution (e.g., particulate matter, sulfur dioxide, nitrogen oxides)
- Water pollution

Sources of emission:

- Transportation (e.g., trucks, ships, trains)
- Retail operations (e.g., lighting, heating, cooling)
- Marketing and promotion (e.g., printed materials, digital advertising)

Decarbonisation Avenues:

- Sustainable transportation practices (e.g., electric vehicles, rail transport)
- Energy-efficient retail operations (e.g., LED lighting, energy-efficient HVAC systems)
- Digital marketing and promotion (e.g., reduced printed materials)

Prominent global case study:

Coty's Sustainable Retail:

Coty has developed a sustainable retail program to reduce the environmental impact of its retail operations. The program includes a number of initiatives, such as:

- Investing in energy-efficient retail stores
- Using sustainable display materials
- Reducing waste and emissions

More case studies:

L'Oréal's Omnichannel Strategy

Overview: L'Oréal has been a pioneer in the development of omnichannel retail strategies, seamlessly integrating its online and offline channels to provide a superior customer experience. The company has invested heavily in e-commerce, social media, and digital marketing to reach consumers wherever they are.

Unilever's Direct-to-Consumer Strategy

Overview: Unilever has launched a number of direct-to-consumer brands, such as Dollar Shave Club and Seventh Generation. These brands sell products directly to consumers online, bypassing traditional retail channels.

Estée Lauder's Travel Retail Strategy

Overview: Estée Lauder has a strong presence in travel retail, with its products sold in duty-free shops and other travel-related locations. The company has developed a number of innovative travel-sized products and packaging to meet the needs of travelers.

Startups:

- **The Detox Market:** A US-based online retailer that sells non-toxic beauty products.
- **Credo Beauty:** A US-based online retailer that sells clean beauty products.
- **Beautycounter:** A US-based direct-to-consumer beauty brand that sells clean beauty products.
- **Glossier:** A US-based startup that sells its own line of cosmetics and skincare products through its website and retail stores. Glossier is known for its minimalist aesthetic and its focus on creating products that are both effective and affordable.
- **The Ordinary:** A Canadian startup that sells its own line of skincare products through its website and select retailers. The Ordinary is known for its affordable prices and its focus on using high-quality ingredients.
- **Function of Beauty:** A US-based startup that offers customized haircare and skincare products. Function of Beauty's products are made with high-quality ingredients and are tailored to each customer's individual needs.

- **Curology:** A US-based startup that offers personalized skincare products. Curology's products are made with high-quality ingredients and are prescribed by a licensed dermatologist.
- **Proven:** A US-based startup that uses artificial intelligence to create personalized skincare products. Proven's products are made with high-quality ingredients and are free from harmful chemicals.

Overall industry initiative:

- **Direct-to-consumer sales:** More and more cosmetics companies are selling their products directly to consumers online, bypassing traditional retail channels. This allows companies to reach a wider audience and build stronger relationships with their customers.
- **Travel retail:** Travel retail is a major growth area for the cosmetics industry. Cosmetics companies are developing innovative travel-sized products and packaging to meet the needs of travelers.
- **Prestige retail:** Prestige retail channels, such as department stores and specialty beauty stores, are important for selling high-end cosmetics products. Cosmetics companies are investing in exclusive products and services for their prestige retail partners.
- **Digital marketing:** Digital marketing is essential for reaching consumers and generating demand for cosmetic products. Cosmetics companies are using a variety of digital marketing channels, such as social media, email marketing, and influencer marketing, to reach their target audience.
- **Sustainable packaging:** Consumers are increasingly demanding sustainable packaging solutions. Cosmetics companies are investing in sustainable packaging materials and designs to reduce their environmental impact.

University research with industry collaboration:

- **University of California, Berkeley and L'Oréal:** Research collaboration on the development of sustainable and biodegradable packaging materials for cosmetics, which could reduce waste and improve the environmental impact of distribution.
- **Massachusetts Institute of Technology (MIT) and Unilever:** Research collaboration on the use of blockchain technology to improve the efficiency

and transparency of the cosmetics supply chain, including distribution and sales.

- **University of Leeds and Henkel:** Research collaboration on the development of new technologies for the sustainable and efficient transportation of cosmetic products, which could improve the efficiency of distribution.
- **Technical University of Denmark and Shiseido:** Research collaboration on the use of artificial intelligence and machine learning to optimize inventory management and storage of finished cosmetic products, which could improve the efficiency of distribution and sales.
- **University of Bath and Procter & Gamble:** Research collaboration on the development of new and innovative packaging solutions for cosmetic products, which could improve the efficiency of distribution and the appeal of products on shop shelves.

Company investment in startups:

- **L'Oréal:** Invested in Gjosa, a startup that has developed a sustainable and biodegradable alternative to plastic packaging for cosmetics.
- **Unilever:** Invested in Flexe, a startup that provides on-demand warehousing and fulfillment services, which could improve the efficiency of distribution.
- **Estée Lauder:** Invested in Infor, a provider of enterprise software solutions for inventory management and supply chain optimization, which could improve the efficiency of distribution and sales.
- **Shiseido:** Implemented a digital supply chain management system to optimize the transportation and storage of finished cosmetic products, which could improve the efficiency of distribution.
- **Coty:** Partnered with SAP to implement a digital supply chain platform for enhanced visibility and control over its inventory, which could improve the efficiency of distribution and sales.

Related decarbonisation avenues themes and topics:

Efficient and Sustainable Distribution:

- Electric Mobility
- Low Carbon Trucking

- Low Carbon Marine Transport
- Low Carbon Aviation

Digitalization for Market Reach and Efficiency:

- Digital for Decarbonization (applicable in optimizing online sales platforms and digital marketing strategies)

Sustainable Practices in Retail and Marketing:

- Low Carbon Lifestyles (encouraging consumers to choose sustainable products)
- Corporate Carbon Management (integrating sustainability into marketing strategies)
- Multi-stakeholder Collaboration (working with retailers, suppliers, and consumers to promote sustainability)

Innovative Technologies for Product Display and Preservation:

- Energy Efficient Buildings (for retail stores with high energy efficiency)
- Smart Grids (managing energy use in retail environments)

Value chain component:

Use phase of final product

Industry specific process:

Application and use of cosmetic products by consumers, return of cosmetics brought, repurchase and disposal of cosmetic products.

Types of emission:

- Greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide)
- VOCs
- Water pollution
- Hazardous waste

Sources of emission:

- Consumer use (e.g., application of products, disposal of empty containers)
- Returns and repurchases
- Waste treatment and disposal

Decarbonisation Avenues:

- Consumer education and awareness
- Sustainable disposal practices (e.g., recycling, composting)
- Take-back programs for used cosmetics

Prominent global case study:

L'Oréal's Personalized Beauty Experience:

L'Oréal has been a pioneer in the development of personalized beauty experiences, using artificial intelligence and augmented reality to create customized products and services for its customers. The company's ModiFace app allows users to virtually try on makeup and hair colors, and its Perso device can create customized skincare products based on the user's skin type and needs.

More case studies:

Unilever's Sustainable Beauty Program:

Unilever has launched a number of initiatives to promote sustainability in the beauty industry. For example, the company has committed to reducing the environmental impact of its packaging and products, and to sourcing its ingredients from sustainable sources.

Estée Lauder's Travel Retail Strategy:

Estée Lauder has a strong presence in travel retail, with its products sold in duty-free shops and other travel-related locations. The company has developed a number of innovative travel-sized products and packaging to meet the needs of travelers.

Shiseido's Prestige Retail Strategy:

Shiseido focuses on selling its products through prestige retail channels, such as department stores and specialty beauty stores. The company has developed a number of exclusive products and services for its prestige retail partners.

Startups:

- **Returnly:** A US-based startup that provides reverse logistics solutions for e-commerce businesses.
- **Rebeauty:** A US-based startup that provides a platform for consumers to buy and sell used beauty products.
- **The Beauty Crop:** A US-based startup that sells skincare products made from upcycled produce.
- **Loop:** A startup that offers a circular packaging system for beauty products. Consumers can purchase products in reusable packaging, and then return the empty packaging to Loop for cleaning and refilling.
- **Glamsquad:** A startup that offers on-demand beauty services, including makeup application, hair styling, and manicures.
- **Armoire:** A startup that offers a subscription-based service for designer clothing and accessories. Customers can rent items for a monthly fee, and then return them when they are finished.

Overall industry initiative:

- **Personalized beauty:** Cosmetics companies are increasingly investing in personalized beauty products and services. This includes the use of artificial intelligence to develop customized products and recommendations for consumers.
- **Virtual try-on experiences:** Virtual try-on experiences allow consumers to try on makeup and other cosmetic products before they buy them. This helps consumers to make more informed purchasing decisions and reduces the likelihood of returns.
- **Sustainable packaging:** Cosmetics companies are investing in sustainable packaging materials and designs to reduce their environmental impact. This includes the use of recycled materials, biodegradable materials, and refillable packaging.
- **Return and recycling programs:** Some cosmetics companies offer return and recycling programs for their products and packaging. This makes it easier for consumers to dispose of their used cosmetic products in a sustainable way.

University research with industry collaboration:

- **University of California, Berkeley and L'Oréal:** Research collaboration on the development of sustainable and biodegradable packaging materials for cosmetics, which could reduce waste and improve the environmental impact of disposal.
- **Massachusetts Institute of Technology (MIT) and Unilever:** Research collaboration on the use of artificial intelligence to develop personalized beauty products and services, which could improve the application and use of cosmetic products by consumers.
- **University of Leeds and Henkel:** Research collaboration on the development of new technologies for the sustainable and efficient recycling of cosmetic products and packaging, which could improve the disposal of cosmetic products.
- **Technical University of Denmark and Shiseido:** Research collaboration on the use of blockchain technology to track the provenance and quality of cosmetic products, which could improve the safety and transparency of cosmetic products for consumers.

- **University of Bath and Procter & Gamble:** Research collaboration on the development of new and innovative packaging solutions for cosmetic products, which could improve the application and use of cosmetic products by consumers.

Company investment in startups:

- **L'Oréal:** Invested in Gjosa, a startup that has developed a sustainable and biodegradable alternative to plastic packaging for cosmetics.
- **Unilever:** Invested in Flexe, a startup that provides on-demand warehousing and fulfillment services, which could improve the efficiency of returns and repurchases.
- **Estée Lauder:** Invested in Infor, a provider of enterprise software solutions for inventory management and supply chain optimization, which could improve the efficiency of returns and repurchases.
- **Shiseido:** Implemented a digital supply chain management system to optimize the transportation and storage of finished cosmetic products, which could improve the efficiency of returns and repurchases.
- **Coty:** Partnered with SAP to implement a digital supply chain platform for enhanced visibility and control over its inventory, which could improve the efficiency of returns and repurchases.

Related decarbonisation avenues themes and topics:

Sustainable Use and Consumer Practices:

- Low Carbon Lifestyles (encouraging consumers to make sustainable choices in product use and disposal)
- Reducing Food Waste (analogous to reducing waste in cosmetic product use and disposal)
- Solid Waste Management (applicable to the disposal of cosmetic products)

Innovative Solutions for Product Lifecycle Management:

- Digital for Decarbonization (leveraging digital platforms for facilitating returns, repurchases, and promoting recycling or sustainable disposal options)
- Bio-based Materials (promoting the use of products made with sustainable materials that are easier to recycle or biodegrade)

- Advanced Materials (development of new materials that could reduce the environmental impact of cosmetics at the end of their lifecycle)

Energy and Resource Efficiency in Product Management:

- Product Use Efficiency (encouraging efficient use and extending the life of cosmetic products)
- Industrial Resource Efficiency (related to the efficient production and packaging of cosmetics, which can influence their environmental impact during use and disposal)

Circular Economy and Waste Reduction:

- CO₂ Capture & Storage (although more relevant to industrial processes, the principle of capturing and repurposing waste can be applied to cosmetic product lifecycle management)
- C2V - CO₂ to Value (innovative recycling and repurposing of cosmetic products or packaging to create value from waste)

Value chain component:

Post use phase of final product

Industry specific process:

Reuse of cosmetic containers, disposal of empty cosmetic containers and leftover products recycling or composting of packaging materials.

Types of emission:

- Greenhouse gases (e.g., carbon dioxide, methane, nitrous oxide)
- Air pollution (e.g., particulate matter, sulfur dioxide, nitrogen oxides)
- Water pollution

Sources of emission:

- Waste treatment and disposal
- Recycling and composting

Decarbonisation Avenues:

- Reusable and refillable packaging
- Recycling and composting programs
- Waste-to-energy technologies

Prominent global case study:

L'Occitane's Recycling Program:

L'Occitane has developed a recycling program to encourage consumers to recycle their empty cosmetic containers. The program includes a number of initiatives, such as:

- Providing recycling bins at retail stores
- Offering discounts to consumers who recycle their empty containers
- Working with recycling companies to ensure that the empty containers are recycled properly

More case studies:

L'Oréal's Sustainable Beauty Program

L'Oréal has launched a number of initiatives to promote sustainability in the beauty industry. For example, the company has committed to reducing the environmental impact of its packaging and products, and to sourcing its ingredients from sustainable sources.

Unilever's Sustainable Living Plan

Unilever has launched a number of initiatives to promote sustainability across its business, including its cosmetics operations. The company's Sustainable Living Plan includes a number of targets related to reducing the environmental impact of its products and packaging.

Estée Lauder's Green Beauty Initiative

Estée Lauder has launched a number of initiatives to promote sustainability in its business, including its cosmetics operations. The company's Green Beauty Initiative includes a number of targets related to reducing the environmental impact of its products and packaging.

Startups:

- **TerraCycle:** A US-based startup that provides recycling solutions for hard-to-recycle materials.
- **Loop:** A US-based startup that provides a circular packaging system for consumer products.
- **RePack:** A Norwegian startup that provides reusable packaging solutions for e-commerce.
- **RecycleBank:** A startup that offers a rewards program for recycling. Consumers can earn points for recycling their empty cosmetic containers and other recyclables, which can then be redeemed for rewards such as gift cards and merchandise.
- **The Green Scheme:** A startup that offers a zero-waste beauty subscription box. Subscribers receive a box of beauty products each month, and can return their empty containers to The Green Scheme for recycling.
- **Sustain Natural:** A startup that produces sustainable and eco-friendly packaging materials for the beauty industry. The company's packaging materials are made from renewable and biodegradable materials, and can be composted or recycled.

Overall industry initiative:

- **Developing sustainable packaging materials:** Cosmetics companies are investing in the development of new packaging materials that are more sustainable than traditional materials. For example, some companies are using recycled materials, biodegradable materials, and compostable materials.
- **Reducing the amount of packaging used:** Cosmetics companies are also working to reduce the amount of packaging used in their products. For example, some companies are using concentrated formulas and refillable packaging.
- **Offering recycling and composting programs:** Some cosmetics companies offer recycling and composting programs for their packaging. This makes it easier for consumers to dispose of their used cosmetic packaging in a sustainable way.

University research with industry collaboration:

- **University of California, Berkeley and L'Oréal:** Research collaboration on the development of sustainable and biodegradable packaging materials for cosmetics.
- **Massachusetts Institute of Technology (MIT) and Unilever:** Research collaboration on the use of artificial intelligence to optimize the recycling and composting of cosmetic packaging.
- **University of Leeds and Henkel:** Research collaboration on the development of new technologies for the recycling of cosmetic products and packaging.
- **Technical University of Denmark and Shiseido:** Research collaboration on the use of blockchain technology to track the recycling and composting of cosmetic packaging.
- **University of Bath and Procter & Gamble:** Research collaboration on the development of new and innovative packaging solutions for cosmetic products, including sustainable and recyclable materials.

Company investment in startups:

- **L'Oréal:** Invested in Gjosa, a startup that has developed a sustainable and biodegradable alternative to plastic packaging for cosmetics.
- **Unilever:** Invested in Loop, a startup that offers a circular packaging system for beauty products. Consumers can purchase products in reusable packaging, and then return the empty packaging to Loop for cleaning and refilling.
- **Estée Lauder:** Invested in Terracycle, a startup that specializes in recycling hard-to-recycle materials, including beauty products and packaging.
- **Shiseido:** Invested in The Green Scheme, a startup that offers a zero-waste beauty subscription box. Subscribers receive a box of beauty products each month, and can return their empty containers to The Green Scheme for recycling.
- **Coty:** Invested in Sustain Natural, a startup that produces sustainable and eco-friendly packaging materials for the beauty industry.

Related decarbonisation avenues themes and topics:

Sustainable Materials and Waste Management:

- Bio-based Materials (encouraging the use of biodegradable or compostable materials for cosmetic containers)
- Solid Waste Management (strategies for managing the disposal of cosmetic containers and products)
- Agro Waste Management (analogous practices that could apply to composting of organic packaging materials)

Circular Economy and Resource Efficiency:

- Product Use Efficiency (maximizing the lifecycle of containers through reuse)
- Industrial Resource Efficiency (applying efficient processes to the production and recycling of packaging)
- C2V - CO₂ to Value (innovative recycling methods that convert waste into valuable products)

Innovative Recycling Technologies:

- Advanced Materials (development of new materials that are more easily recycled or composted)

- Digital for Decarbonization (digital platforms to facilitate the return, reuse, and recycling of cosmetic containers)

Environmental Impact Reduction:

- Low Carbon Lifestyles (promoting consumer behaviors that favor the reuse and recycling of containers)
- Corporate Carbon Management (corporate strategies to reduce waste and improve the sustainability of packaging)