

ACCENTURE PROJECT

Question :

How can emissions related to the transportation of goods be reduced by optimizing the supply chain (e.g., local production, transportation optimization, better demand forecasting, and stock management)?

ModeX seeks to :

- Minimize fabric waste in the design process
- Encourage the use of ecological materials for its collections and promote recycling
- Optimize supply chain processes to reduce emissions related to goods transportation

Seeks support in **identifying and implementing the most relevant GenAI use cases** related to sustainable fashion.

These use cases may target various populations (e.g., Designers, Marketing Teams, Purchasing Teams, Production Managers, etc.) and should be selected based on their impact on the ModeX's challenges and feasibility.

1. Analyse et Compréhension du Problème

La surproduction et les pertes de tissu pendant la fabrication contribuent à un gaspillage important, tandis que le modèle fast fashion encourage des achats impulsifs pour des vêtements portés en moyenne seulement 7 à 8 fois. À la fin de leur vie, 87 % des vêtements en Europe sont incinérés ou enfouis, soulignant le manque de systèmes efficaces de collecte et de réutilisation.

Afin de minimiser ce gaspillage, la revente en seconde main et les services de location réduisent la surproduction en prolongeant la durée de vie des vêtements, tandis que des technologies comme Blend Re:wind facilitent le recyclage des fibres mélangées.

En parallèle, les marques comme Filippa K intègrent des modèles circulaires avec des réparations, des garanties longues et des produits upcyclés.

Environ 15-20 % des textiles usagés sont collectés dans l'UE, avec des écarts significatifs entre pays (ex. Allemagne 70 %). Les technologies de recyclage chimique émergent lentement, permettant de créer des fibres de haute qualité, bien qu'encore coûteuses.

Le coton biologique, le chanvre et le lin réduisent les impacts environnementaux en nécessitant moins d'eau et de pesticides, tandis que des innovations comme le lyocell (à partir d'eucalyptus) gagnent en popularité. Le polyester recyclé, bien que prometteur, pose des défis liés aux microplastiques et à sa faible adoption (14 % en 2017).

Les matériaux sont jugés sur leur empreinte écologique, incluant leur consommation en eau et

leurs émissions de GES, ainsi que sur leur viabilité industrielle et leur coût d'adoption. Les textiles biosourcés, tels que le Piñatex fabriqué à partir de feuilles d'ananas, sont des exemples inspirants, bien qu'encore en développement.

Les fibres naturelles, bien que renouvelables, nécessitent une meilleure gestion pour minimiser leur impact (ex. coton bio plus performant que le coton conventionnel). L'industrie explore aussi les fibres hybrides pour combiner durabilité et performance (ex. mélanges coton-recyclé).

Produire localement limite les longues chaînes d'approvisionnement, tandis que l'utilisation d'algorithmes d'IA pour optimiser les trajets et la gestion des stocks diminue les émissions inutiles. Des outils comme les assistants IA de Bricorama permettent aussi de prévoir la demande pour réduire les excédents.

Bien que la logistique ne représente que 2 % des impacts climatiques de l'industrie textile, le packaging et les produits non vendus créent une empreinte additionnelle significative. Des cas réussis comme Instacart montrent que l'intégration d'IA permet de rationaliser les flux, réduisant les délais et les déchets.

ModeX a pour objectif la réduction des émissions et des déchets pour répondre aux attentes des consommateurs et législateurs. En effet, les consommateurs deviennent de plus en plus conscients de l'impact environnemental de leurs achats. D'autre part, les législateurs imposent à bon escient des normes strictes concernant la gestion des déchets et des émissions de carbone. L'entreprise ModeX doit donc trouver des solutions pour réduire son empreinte écologique pour rester en phase avec ces exigences.

Cela passera par **l'introduction de matériaux durables sans compromettre les coûts.** Bien qu'indispensables, les matériaux restent souvent plus coûteux que leurs alternatives classiques. ModeX doit réussir à équilibrer innovation durable et rentabilité pour garantir une adoption à grande échelle sans impact sur les prix de vente.

Par ailleurs, il est nécessaire d'améliorer **l'optimisation logistique pour rester compétitif.** L'efficacité des opérations logistiques est un levier clé pour diminuer les coûts et les émissions. ModeX doit donc mettre en place des solutions logistiques performantes et intelligentes pour optimiser les stocks, les trajets de transport et minimiser les pertes liées aux produits invendus.

ModeX adoptera un modèle de production circulaire dès la phase de conception des vêtements. Cela intégrera des matériaux recyclables et en facilitera ainsi la réparation ou la revente des produits. Par conséquent, l'entreprise permettra la prolongation de la durée de vie des vêtements et de réduire la demande de nouvelles matières premières.

En adoptant des pratiques durables et visibles, comme l'utilisation de matériaux certifiés écologiques et le recyclage, ModeX peut se différencier sur le marché. La communication transparente sur les efforts en matière de durabilité attirera une clientèle de plus en plus soucieuse de l'environnement.

L'entreprise investira dans des technologies avancées, comme le recyclage chimique des fibres ou les technologies de revalorisation des textiles usagés. Cela permettra à ModeX de transformer les déchets textiles en nouvelles matières premières et ainsi de réduire les coûts de production à long terme tout en contribuant à la réduction des déchets.

2. Idéation et Recherche de Solutions

1. Route Optimization Models

- Use models like **Dijkstra's Algorithm**,
- AI-based systems like **Deep Reinforcement Learning (DRL)** (MISTRAL).
- Purpose: Minimize distances, fuel consumption, and emissions by identifying the most efficient delivery routes, respect users privacy with local servers

=> Data on transportation costs and emissions: distance, transport type (truck, train, ships, etc.), fuel used + Data on suppliers

2. Demand Prediction Models for better fleet and Stock Management

- AI Models: **Time Series Forecasting** using models like SARIMA (takes in account the trend and seasonality of data) and clustering (K-Means) for depot optimization, fleet grouping to improve stock management.
- Purpose: Forecast demand to reduce overloading vehicles, avoid wasted trips, and optimize vehicle capacity. Have better stock management.

=>Real-time sales data from points of sale: stock levels, daily sales, seasonal sales + Data on transportation costs and emissions: distance, transport type (truck, train, ships, etc.), fuel used, + Historical sales data and collection performance: seasonality, promotions, past trends +Data on suppliers

3. Carbon Emission Tracking

- IOT : integrate IoT and telematics for real-time emissions tracking.
- Purpose: Monitor and reduce carbon emissions based on vehicle type, fuel consumption, and route conditions.

=>Data on transportation : emissions, distance, transport type (truck, train, ships, etc.), fuel used

3. Développement d'une Proposition Marketing et Communication

- Develop a communication plan to raise consumer awareness about ModeX's sustainability commitment.

- Propose marketing campaigns to promote the use of eco-friendly materials and waste reduction (e.g., storytelling about the lifecycle of a sustainable garment).

Communication plan to raise consumer awareness:

Objective: Build ModelX's reputation as a sustainability oriented company by highlighting its efforts to optimize supply chain emissions, promote local production, and reduce waste.

Create a sustainability statement / slogan

Target Audience:

- Environmentally conscious people
- Millennials and Gen - Z (as they are more sustainability oriented)
- Businesses who are seeking sustainable partners

Methods to raise awareness:

- Raising awareness using digital channels (e.g. Social Media, Email Newsletters, Blogs etc.)
- Partnerships with influencers, NGO's and sustainability companies to increase awareness
- Special in-store practices (Information and details about sustainability)
- PR Events/Workshops/Seminars (to raise awareness about ModelX's sustainability plans)
- Develop a specific section on the website dedicated to sustainability
- Rewards for sustainable choices (points for every sustainable choice made)
- Creating a documentary of ModelX's sustainable practices

Possible Marketing Campaigns:

Campaign 1:

- **Storytelling Focus:**
Create a digital and in-store campaign showcasing the lifecycle of ModeX garments produced using optimized, low-emission supply chains.
Example storytelling elements:
 - **Local Production Stories:**
Highlight collaborations with local manufacturers to reduce transportation emissions.
 - **Behind-the-Scenes Features:**
Short videos or infographics illustrating reduced-emission transportation methods (e.g., train instead of truck).
 - **Impact Metrics:**
Showcase tangible environmental benefits, e.g., "By choosing ModeX, you helped save X kg of CO₂ this year."
- **Interactive Consumer Experience:**
 - Introduce a **"Carbon Tracker"**:
 - At checkout (online/in-store), show the estimated carbon reduction compared to traditional supply chains.
 - Gamify sustainability: Customers earn "eco-points" for choosing products with lower carbon footprints, redeemable for discounts or donations to environmental causes.

Campaign 2:

- **Local Production Advocacy:**

Spotlight products made in nearby regions to reduce shipping emissions. Label products with:

- **“Locally Made” Tags:**

Unique markers for garments produced within X kilometers of a store.

- **“Certified Low-Emission Supply Chain” Badges:**

Visually appealing stamps that communicate the environmental benefits of optimized logistics.

- **Educational Content:**

- Use social media posts or blogs to educate consumers about the importance of local sourcing.

- Collaborate with eco-influencers to amplify this narrative.

Campaign 3

- **Fabric Waste Awareness Campaign:**

While focusing on transport, integrate waste reduction messaging:

- **Pop-Up Workshops:**

Host events in flagship stores where customers can learn how garments are designed for minimal waste and maximum sustainability.

- **Partnerships with Recycled Material Suppliers:**

Highlight their role in reducing environmental impact

4. Élaboration d'un Plan Stratégique de Déploiement

Proposer une stratégie de déploiement pour les solutions retenues (phases, budgets, KPI).

1. Data Preparation and Integration (0–3 Months):

Estimated Budget: €5-10 million

Breakdown: Software integration (€3-5 million), consultancy (€1-2 million), training (€1-3 million).

- **Centralize Data Sources:**

Gather relevant data, including historical sales, fabric waste patterns, stock levels, transportation costs, emissions data, and supplier information. Important data to gather: (Transportation and route data, Fleet data, demand data, environmental data, operational data, fuel and emission data and customer data)

ModeX can work with softwares like SpheraCloud to centralize operational data from multiple sources, such as historical sales, production patterns, transportation data, and emissions records.

Sphera enables seamless integration of data from thousands of sources using high-frequency data integration and APIs.

The platform applies robust quality rules to clean, validate, and standardize data, ensuring only verified information is used for calculations.

- **Clean and Standardize Data:**

Ensure data is structured and accurate for AI models to deliver actionable insights.

The collaboration with Softwares like SpheraCloud will help and simplify the process and support the company as its award-winning calculation engine ensures data transparency and audit readiness, providing clear logic for all emissions and sustainability metrics.

- **Establish Key Metrics (KPIs):**

Financial KPIs

Gross Margin

Relevant for tracking the financial impact of using eco-materials and optimizing production processes.

Cost of Goods Sold (COGS)

Critical for evaluating the cost-effectiveness of adopting sustainable materials and technologies.

Net Profit Margin

Useful to ensure profitability while transitioning to sustainable practices.

Gross Margin ROI

Helps determine the return on investments in sustainability-focused technologies like GenAI or recycling systems.

Customer-Centric KPIs

Customer Lifetime Value (CLV)

Indicates how sustainability efforts (like eco-friendly materials and carbon transparency) affect long-term customer loyalty.

Market Share

Tracks ModeX's competitiveness in the growing sustainable fashion market.

Channel Sales %

Provides insight into the performance of sustainable products across physical stores and online channels.

Operational KPIs

Fabric Waste Reduction (%)

- This directly measures the efficiency of the design and production processes, especially when adopting GenAI for pattern optimization.

Inventory Turnover Ratio

Essential for monitoring efficiency in stock management, especially when adopting demand forecasting models to reduce waste and overproduction.

Forecast Accuracy

Key for improving supply chain efficiency and ensuring that sustainable materials are adequately stocked without excess.

% of Reporting Deadlines Met

Reflects compliance with strict sustainability regulations like California's SB 253 or EU directives,

Environmental KPIs

Emissions Saved (kg CO₂)

Tracks the success of supply chain optimizations (e.g., route efficiency, local production) and the adoption of low-emission technologies.

Place under *Environmental KPIs* to highlight ModeX's contribution to climate goals and regulatory compliance (e.g., California's SB 253).

Increase in Use of Recycled Materials (%)

Monitors progress in sourcing eco-friendly and sustainable materials, a critical component of ModeX's sustainability strategy.

Place under *Environmental KPIs* as a measure of the shift toward circular economy practices.

- **Evaluate Existing Technologies:**

Assess current tools (e.g., IoT sensors, ERP systems) for integration with GenAI solutions.

IoT Sensors + GenAI: Use real-time IoT data to train AI models that optimize production schedules or transportation routes.

ERP + GenAI: Leverage ERP data (e.g., sales, inventory levels) to enable AI-driven demand forecasting or identify inefficiencies in production.

Evaluation criteria: Data compatibility, integration capabilities, Scalability, real time capabilities.

Phase 2: Pilot and Proof of Concept (3-6 Months)

Estimated Budget: €10-20 million

Breakdown: Pilot program (€5-7 million), training (€2-3 million), marketing (€2-4 million), technology testing (€2-3 million).

- Launch a pilot program in a specific region or business unit:

ModeX should launch the pilot program in **France** due to its strong regulatory framework, including the **Anti-Waste Law for a Circular Economy (AGEC)** and alignment with the EU's **Sustainable Textiles Regulation**. France provides an ideal testing ground for sustainability initiatives, offering a highly eco-conscious consumer base and strict environmental standards, which will help ensure the pilot meets compliance. Additionally, ModeX's established operational network in France, including logistics centers and physical stores, supports efficient implementation. The insights gained from this pilot can be scaled to other EU markets, reinforcing ModeX's commitment to sustainability and positioning it as a leader in the industry

- Train involved teams (e.g., designers, purchasing managers, logistics staff) on the use of new tools or processes. (tailored training sessions, cleared documentation and collaborative learning)
- Collect feedback and measure initial impact on selected KPIs.

Phase 3: Gradual Scaling (6-12 Months)

Estimated Budget: €50-75 million

Breakdown: Tech scaling (€15-25 million), logistics optimization (€15-20 million), training (€5-10 million), supplier partnerships (€10-15 million), marketing (€5-10 million).

- Adjust the solution based on pilot results. (user feedback and data-driven adjustments)
- Expand implementation to a national or regional level, ensuring integration with other internal systems (e.g., SAP, IoT): integrating demand forecasting tools with **SAP ERP** can ensure seamless inventory and production management at scale. (Consistency Across Regions)
- Strengthen partnerships with key suppliers to ensure access to sustainable materials or optimized transport routes. (Collaborate on logistics and RandD).

Phase 4: Global Adoption (12-18 Months)

Estimated Budget: €100-150 million

Breakdown: Global system integration (€40-60 million), logistics and green tech (€20-30 million), continuous improvement (€15-20 million), global supplier engagement (€10-15 million), marketing (€10-15 million).

- Roll out the solution across ModeX's global network. (Prioritize key markets, scalable infrastructure, core practices standardized across regions)
- Incorporate continuous improvement practices based on new data and emerging technologies.
- **Standardize key processes** globally, but adapt to local needs and regulations.
- **Ensure comprehensive training** and create **sustainability champions** in each region.

- Use **real-time monitoring** and **global feedback loops** to continuously improve operations.
- Foster **strong supplier relationships** to maintain sustainable sourcing and logistics.
- Stay updated with **emerging regulations** and **technologies** to adapt and evolve.
- Use **automated ESG reporting** to simplify compliance and enhance transparency.
- **Communicate ModeX's sustainability story** both internally and externally to engage employees and customers.

5. Identify Key Partners for Sustainable Sourcing or Green Logistics

The budget includes collaboration with sustainability certification bodies (e.g., GOTS, Fair Trade), logistics providers (e.g., UPS, Maersk), and material innovators to source eco-friendly materials and optimize transportation.

- Collaborate with organizations specializing in sustainable materials certification (e.g., GOTS, Fair Trade).
ModeX can form deeper partnerships by **Co-developing New Sustainable Materials**: Partner with material innovators (e.g., those developing plant-based, biodegradable, or upcycled materials) to create exclusive collections or co-branded products. **Material Traceability**: Collaborate with certification organizations to implement blockchain or traceability technology that provides full transparency about where materials come from, ensuring the materials are truly sustainable from start to finish. **Set Sustainability Standards**: Work with certification bodies to develop or adopt new sustainability standards specific to the fashion industry's needs, ensuring ModeX's products exceed industry norms.

Potential Partners: GOTS (Global Organic Textile Standard): For certified organic fabrics and sustainable production practices. **Fair Trade**: For ensuring ethical labor practices and sourcing from suppliers committed to fair wages. **Recycled Textile Companies**: Partner with organizations like **The Textile Exchange** or **Fashion for Good** to promote innovations like **recycled polyester** or **circular fabrics**.

- Copy and learn: implement good ideas from competitors: companies such as H&M run voluntary collection schemes and accept used clothes of any brand, regardless of whether they are still usable or not, in their shops in return for a small reward. **Create Brand-Specific Take-Back Programs**: Instead of accepting **any brand's clothes**, ModeX could create a **brand-loyalty program** where customers return ModeX clothing exclusively for recycling or upcycling. This could allow ModeX to ensure their products are handled sustainably.

Offer Incentives for Recycling and Repair: Provide **greater rewards** (e.g., discounts, loyalty points, or donations to environmental causes) for customers who return clothes in good condition for **repair or reuse**, rather than just accepting unusable garments. ModeX could even collaborate with **repair companies** to offer free or discounted garment repairs.

Digital Tracking of Clothing Lifecycles: Introduce a **mobile app** or **QR codes** on clothing labels that allow customers to track their garments' **sustainability journey** — from purchase, through

recycling or resale, to its eventual upcycling or disposal. This fosters customer engagement and loyalty.

- Partner with logistics providers utilizing green technologies such as electric vehicles or optimized route planning.

UPS and DHL: These companies have already made significant strides in **green logistics**, including electric vehicle fleets and route optimization algorithms.

Maersk: For carbon-neutral shipping and efforts to reduce emissions from global shipping operations.

Tesla or Rivian: For electric vehicle partnerships focused on the last mile or delivery fleets.

6. Prepare Impactful Slides for Jury Presentation

The budget covers the creation of compelling visuals, reporting systems, and marketing efforts to communicate sustainability progress both internally and externally to engage stakeholders and ensure compliance.

- Clearly outline the project's objectives, steps, and expected outcomes.
- Use visuals (charts, infographics) to emphasize measurable impacts like emissions reduction, cost savings, and waste minimization. (enhance the visuals with **before/after comparisons**)
- Highlight the alignment of the project with ModeX's sustainability and business goals to strengthen its value proposition.

Total Estimated Budget: €165 - 260 million

This budget represents about **0.5% to 0.75% of ModeX's annual revenue** and is focused on technology, logistics, training, and global scaling to meet sustainability goals while ensuring profitability and regulatory compliance.

5. Analyse de Faisabilité et Impact:

Feasibility Analysis for ModeX's Sustainability Strategy

1. Risk Analysis

A. Regulatory Compliance Risk

- Risk: ModeX's global operations must comply with varying environmental regulations (e.g., EU Sustainable Textiles Regulation, California SB 253). Compliance challenges may arise due to different requirements across regions, leading to delays or additional costs in the scaling phase.
- Mitigation:

- Implement a centralized compliance tracking system to monitor evolving regulations in each key market.
- Allocate in-house legal teams and partner with external compliance consultants to stay ahead of regulatory changes.
- Build relationships with regulatory bodies to ensure smooth certification processes for sustainable materials and green logistics.

B. Technology Integration Risk

- Risk: Integrating GenAI, IoT sensors, and ERP systems globally could face compatibility issues with legacy systems, slowing down progress and causing integration costs.
- Mitigation:
 - Conduct a pre-implementation audit of existing infrastructure to identify gaps and integration challenges.
 - Partner with specialized third-party consultants for seamless integration of AI tools and IoT systems into existing platforms like SAP and SpheraCloud.
 - Allocate technical resources for dedicated troubleshooting and pilot testing to ensure smooth rollouts in key regions before global expansion.

C. Supply Chain Disruption Risk

- Risk: Sourcing sustainable materials and adapting logistics to green technologies (e.g., electric vehicles) may face supply chain bottlenecks or increased costs, impacting timelines.
- Mitigation:
 - Diversify suppliers: Form strategic partnerships with multiple sustainable material suppliers to ensure flexibility in case of shortages.
 - Invest in local production hubs: Prioritize establishing production facilities closer to key markets to minimize transportation risks and reduce carbon emissions.
 - Work with logistics providers (e.g., Maersk, Tesla) to pilot green logistics solutions and assess scalability before full implementation.

2. Resource Analysis

A. Human Resources

- Resource Need: ModeX will require cross-functional teams for the successful implementation of this strategy. Key personnel include:
 - Data scientists for AI modeling (demand forecasting, route optimization).
 - Logistics experts to oversee green logistics implementation and ensure operational efficiency.
 - Marketing teams to communicate sustainability efforts to stakeholders.

- Sustainability experts to guide the circular economy transition (material sourcing, waste reduction).
- Action: Train existing employees on sustainability tools and hire necessary talent to support cross-functional collaboration.

B. Technology and Infrastructure

- Required Investments:
 - GenAI tools for logistics optimization, IoT sensors for real-time tracking, and ERP software to integrate and centralize data.
 - Scalable cloud platforms (e.g., SpheraCloud) for real-time emissions tracking and data-driven sustainability metrics.
- Action: Prioritize cloud infrastructure and AI model development for scalability, with a focus on minimizing operational disruptions during global deployment.

3. Financial Feasibility

A. Initial Investment Breakdown

The estimated total cost across all phases is €165 - 260 million, which is about 0.5% to 0.75% of ModeX's €35 billion annual revenue. This reflects investments in:

- Technology: €40-60 million for system integrations (AI, IoT, ERP, SpheraCloud).
- Logistics Optimization: €20-30 million for sustainable transport technologies (electric vehicle fleets, route optimization).
- Training & Scaling: €15-25 million for employee training, supplier partnerships, and scaling efforts across regions.
- Marketing & Communication: €10-20 million for global marketing campaigns and sustainability communication.

B. Return on Investment (ROI)

- Operational Efficiencies: Implementing green logistics (route optimization, local production) can reduce fuel consumption and transportation emissions by up to 15%-20% annually, leading to significant cost savings.
- Sustainability Differentiation: ModeX's commitment to sustainability can command a premium pricing strategy in eco-conscious markets, leading to higher customer retention and increased market share. Targeted campaigns will appeal to Millennials and Gen Z consumers, who prioritize sustainability.

C. Long-Term Benefits

- Reduced Waste & Lower Production Costs: Adopting circular economy principles (e.g., using recycled materials) reduces reliance on raw material extraction, which can cut production costs by approximately 10-15% over time.

- **Compliance with Regulations:** Meeting or exceeding EU regulations and other regional standards will reduce potential fines and ensure continuity in global markets. For instance, adopting low-emission technologies now will avoid penalties from carbon taxation in the future.

4. Financial Risk Management

- **Risk:** Initial costs are high, but the return comes in the form of long-term cost savings, brand differentiation, and competitive advantage. ModeX must balance upfront investment with the sustainability benefits.
- **Funding Sources:** ModeX can explore green bonds or ESG-linked financing to raise capital at lower interest rates, ensuring the financial feasibility of the sustainability transition.