Green Manufacturing Trends, Opportunities and Challenges

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Introduction of the project

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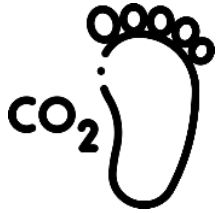
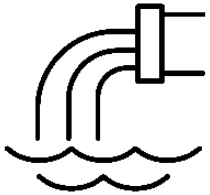
Background of the project

1 Environmental footprint of fashion industry



10%
of global GHG emissions



20%
of wastewater

2 Align with international sustainability targets

The Paris Agreement
Limit the global temperature increase to < 1.5 - 2°C when compared with the preindustrial level

3 Challenges faced by SMEs

- Lacking of **in-depth knowledge** on global trend of and **resources** in developing environmentally-friendly manufacturing processes

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Project objectives

1. To facilitate Hong Kong fashion and textile enterprises better **understand their progress in green manufacturing** in comparison with other regions through the research study

2. To arouse practitioners of Hong Kong fashion and textile industry's **awareness on the important sustainability and green manufacturing trends** and enhance their knowledge on managing green manufacturing

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Project deliverables (Research)

Desktop research

- **12** reports

Stakeholder interviews

- **35** representatives selected from the survey (local fashion and textile SMEs) + **15** individual subject experts
- Experts from:
  - industry associations;
  - testing and certification bodies;
  - supply chain partners;
  - academic and public organisations;
  - government departments; and
  - related bodies

Questionnaire survey

- Over **120** respondents
- Include:
  - textile manufacturers;
  - exporters;
  - buyers;
  - academia;
  - industry associations;
  - testing and certification bodies

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Project deliverables (Report in e-version)

Desktop research + questionnaire survey + stakeholder interviews

Qualitative findings

Gap analysis

- Level of understanding on global sustainability and green manufacturing trends;
- Knowledge on existing technologies to achieve green manufacturing; and
- how well they managed green manufacturing

10 case studies

selected from the 35 company representatives of the stakeholder interviews

- Trends;
- Technologies; and
- Challenges/Opportunities to fashion and textile enterprises in achieving business competitiveness in practical context

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Report Website

Report

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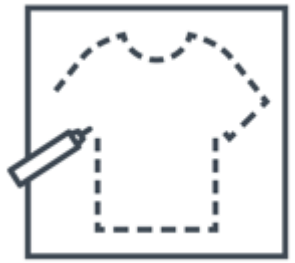
Project deliverables (Seminar & Webpages)

Seminar (Hybrid mode)

- To disseminate the findings of the research
- To arouse the Industry's awareness on the important sustainability and green manufacturing trends
- To enhance the Industry's knowledge on managing green manufacturing



Project webpages

- Sustainable issues related to green manufacturing will be included
- Q&A on green manufacturing related to carbon footprint, waste water management and energy optimisation
- Report, video of seminar, text of summary about seminar, etc.

https://sustineri.org.hk/tsf-project-tc/?lang=zh-hant

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Current status of the industry

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The fashion and textile industry: one of the major contributors to environmental impact

Chemicals Water Energy

Design → Manufacturing → Packaging → Distribution → After-sales service

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Environmental impact of fast fashion

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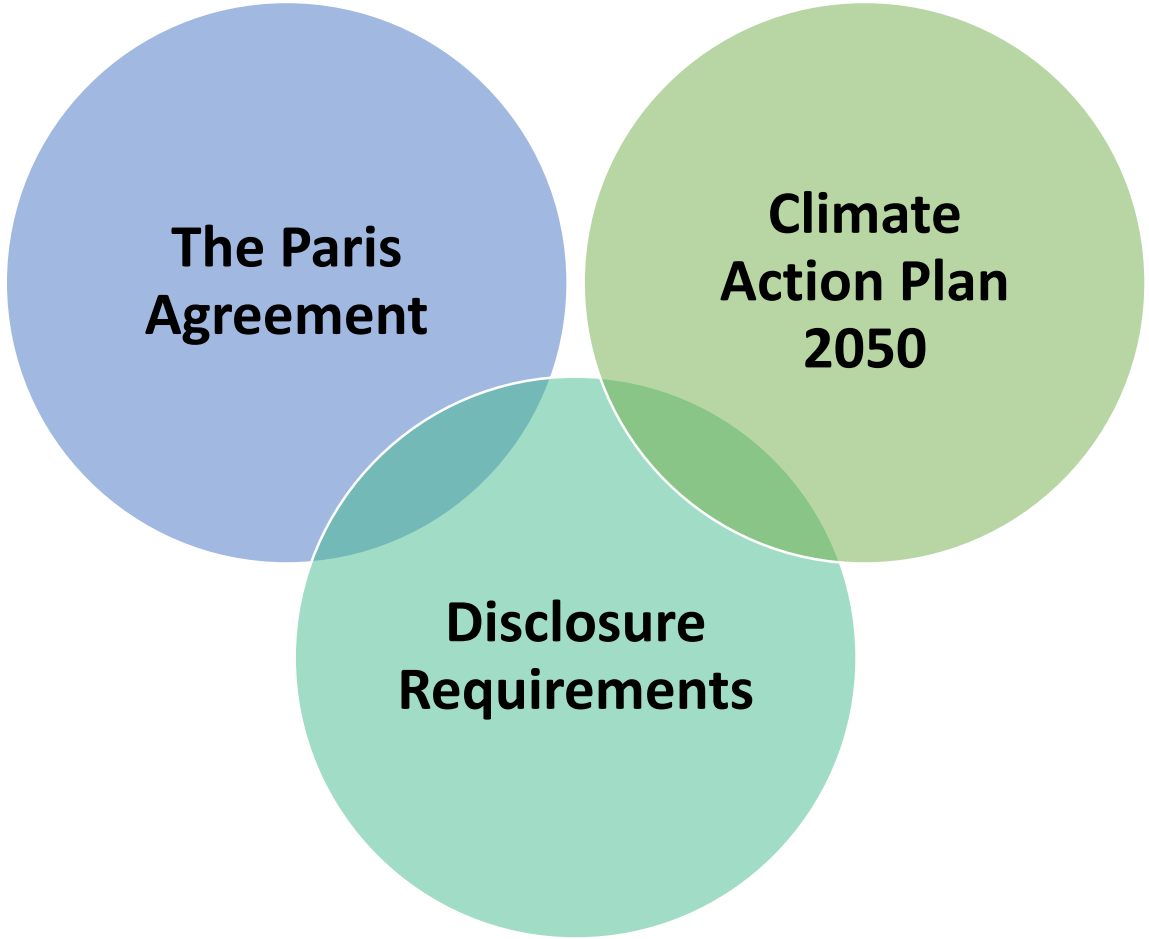
Some sustainability trends



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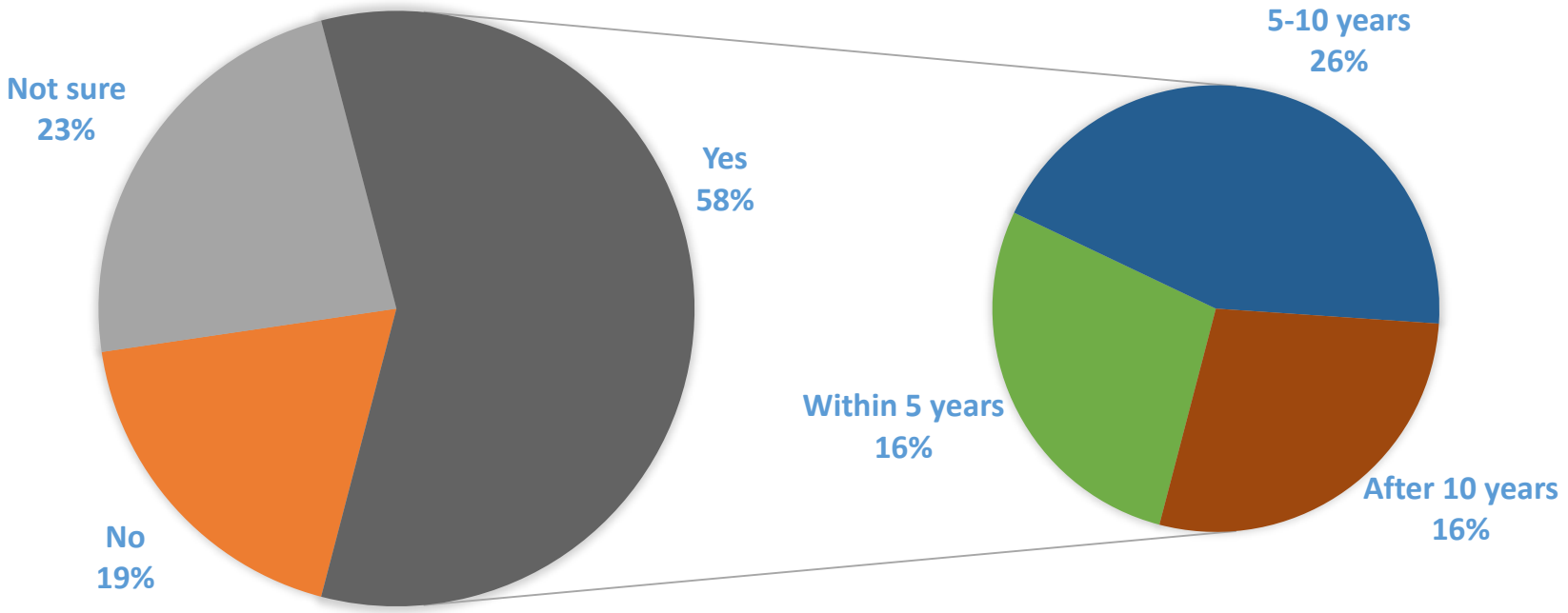
Future trends

DO YOU THINK A LARGE-SCALE SUSTAINABLE DEVELOPMENT TRANSITION OF THE FASHION AND TEXTILE INDUSTRY WILL HAPPEN IN THE FUTURE?



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Latest Global Green Manufacturing Trends

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1 Moving towards Smart Manufacturing

- Apply various digital or smart technologies
  - Internet of Things (IoT)
  - Automation
  - Artificial Intelligence (AI)
  - Data Analytics
- Minimise resource consumption

2 Increasing Interest in Applying Recycled Materials

- Use recycled polyethylene terephthalate (rPET) instead of traditional polyester
- Use other recycled materials

3 Promoting a Circular Economy

- Embrace the idea of a circular economy instead of disposing of used products
- Extend the lifetime of a fashion product through material technology and proper care

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4 Wastewater Management

- Cope with wastewater discharge problems and protect water resources
- Apply innovative technology to improve effectiveness of wastewater treatment
  - Integrated Fixed-Film Activated Sludge/Anaerobic Ammonium Oxidation, Anammox (IFAS-MOX) wastewater treatment
  - Reverse Osmosis (RO) plus Catalytic Wet Air Oxidation (CWAO) integrated system

5 Achieving Energy Efficiency

- Invest in high-efficiency lighting, HVAC systems and machinery to reduce energy consumption
- Optimise energy use by energy audits
- Explore renewable energy options to reduce the reliance on fossil fuels
- Build a culture of energy efficiency through education, training and awareness-raising initiatives

Challenges faced by the Industry Identified in Interviews

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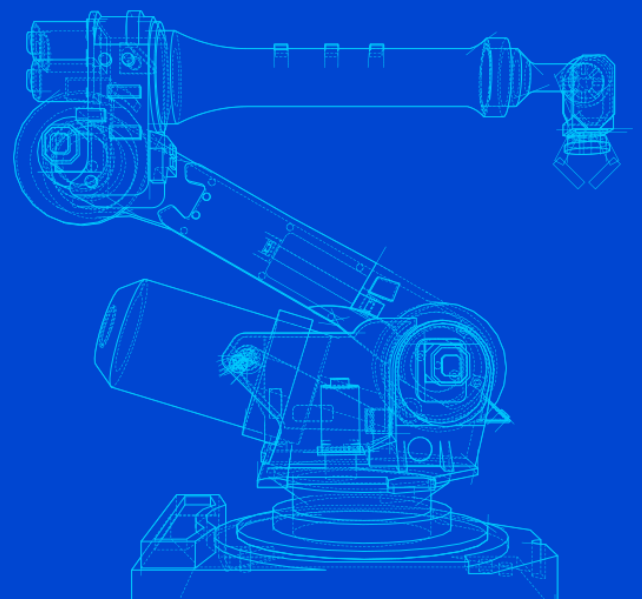
Challenges



- Cost
- Innovative technologies
- Supply Chain
- Regulations

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Challenges faced by the industry:
Lack of resources, market demand & experience sharing

Sustainable Materials

Green Technologies

Textile Recycling

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Challenges: Sustainable Materials

- More costly than virgin materials
- Unstable sources of sustainable materials
- SMEs are often not able to meet minimum order amounts
- Relatively low market demand in Hong Kong

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Challenges: Green Technologies

- The SME interviewees have expressed many considerations in the treatment of pollutants from production
- SMEs have financial concerns about new applications
- SMEs are unwilling to invest more since they have no self-owned factories

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Challenges: Textile Recycling

- Mixed textile waste is hard to recycle
- Current product designs do not accommodate recycling
- Recycling in Hong Kong is not profitable since the local demand for recycled materials is niche
- The recycling industry has little support, so fewer companies will consider joining this industry

Opportunities:
How to achieve green manufacturing?

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Opportunities:
The industry is transforming to a greener one

Green Technologies

Sustainable Design

Growing demand for sustainable and environmentally friendly products

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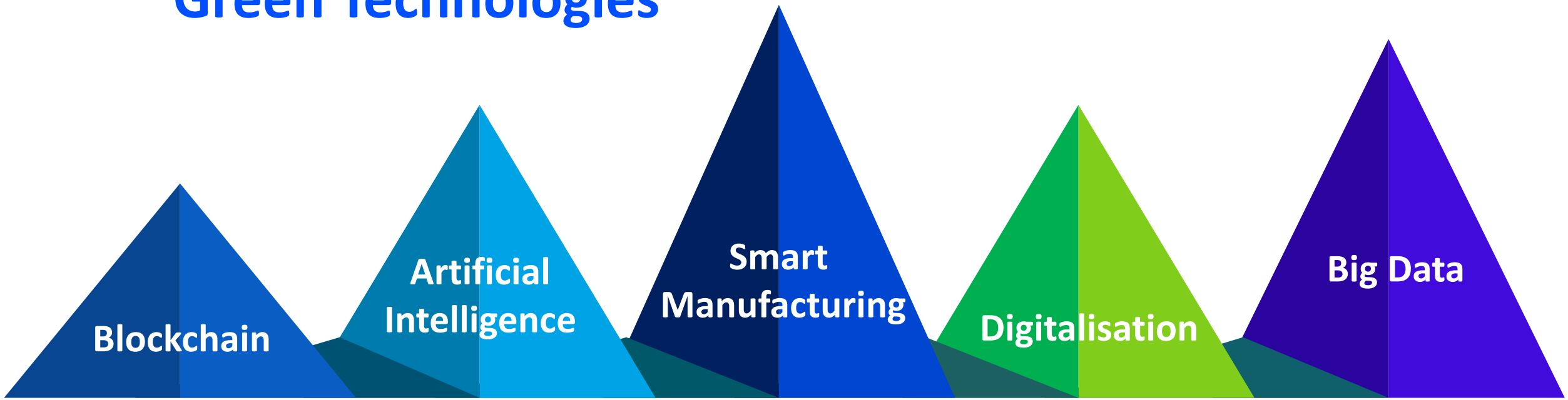
Green Technologies



- Prediction
- Real-time monitoring
- Swift response
- Recycle

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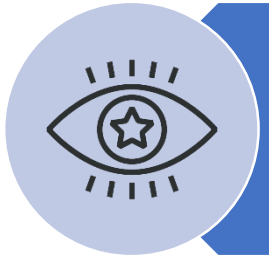
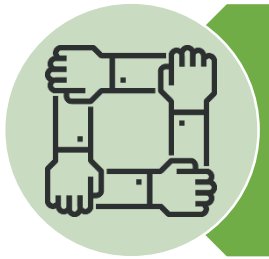
Sustainable Design



Re-designing disposed products to sell at lower prices

Developing multi-purposed products



Selecting durable and sustainable materials

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The way forward

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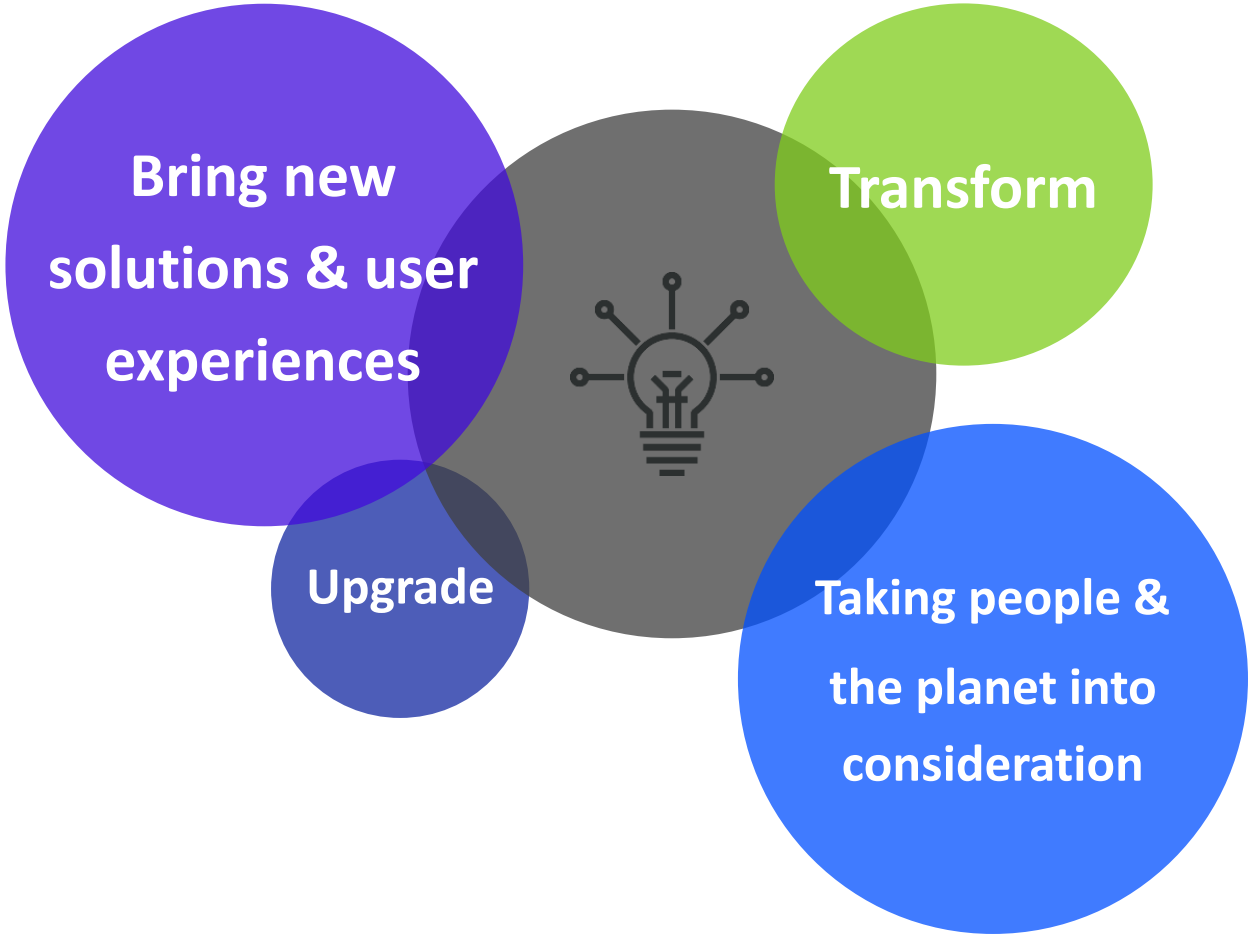
The importance of sustainability awareness and innovations



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Report Findings

Top three actions that help achieve green manufacturing and carbon neutrality

Developing Sustainable Materials

Sustainable Product Design

Reducing Product Packaging

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Report Findings

Top three supportive measures to achieve green manufacturing

- **Public Education on Sustainability**
- **Training and Skill Development**
- **Green Subsides**

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LET'S WORK TOGETHER TO IMPLEMENT

GREEN MANUFACTURING

#HK fashion #sustainability #innovative

#investment #technology #design

- Plan
  - Execute
- Monitor
  - Enhance

Sustainable Concepts + Management System = Green Manufacturing

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Thank you

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