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Sustainable Fashion:

Potential Directions for Technological Development

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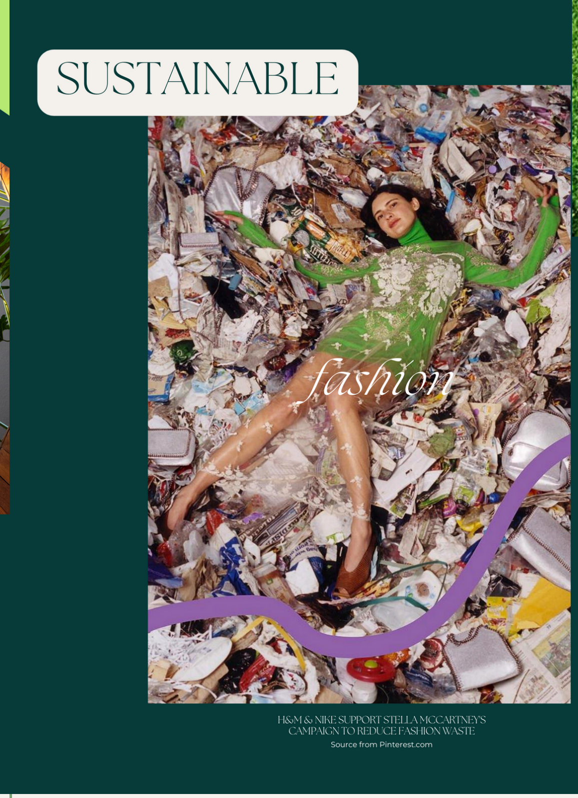


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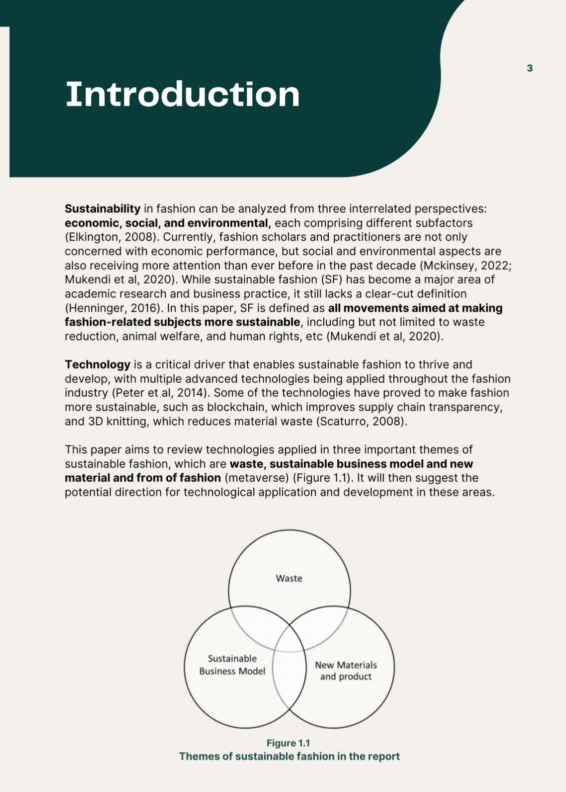
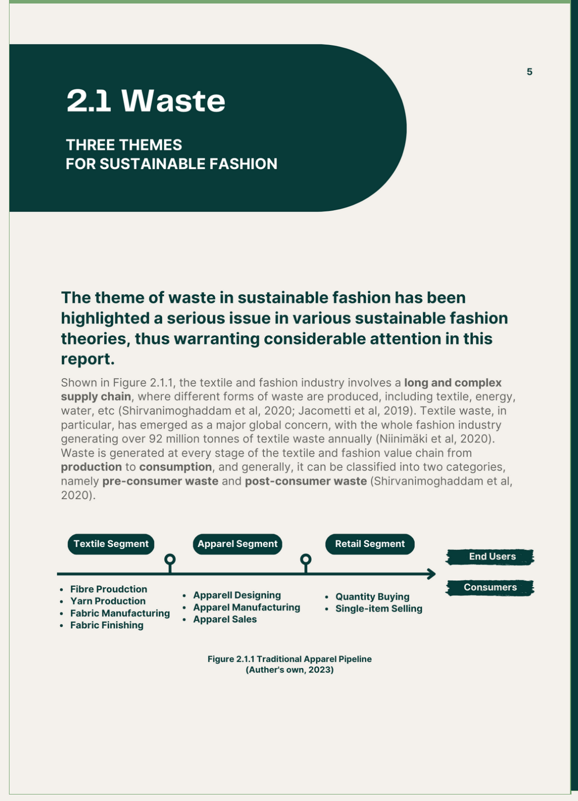

Introduction

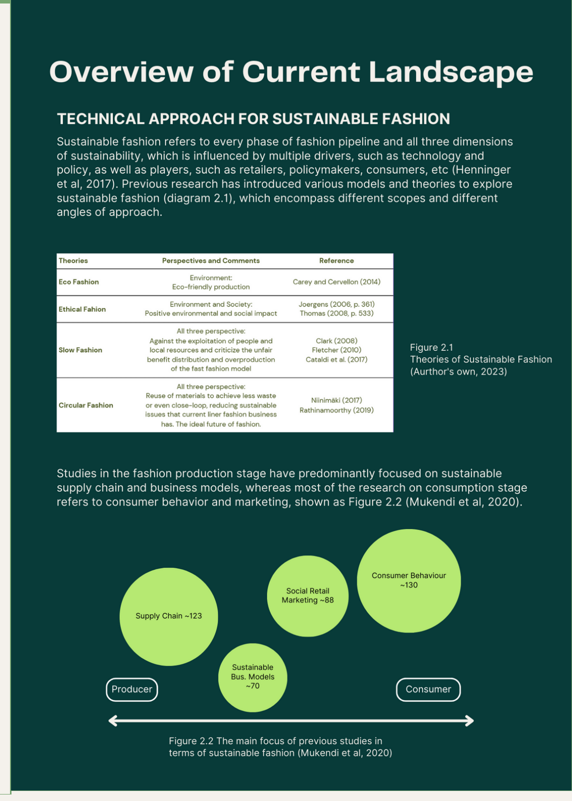
Figure 1.1 Themes of sustainable fashion in the report


2.1 Waste

THREE THEMES FOR SUSTAINABLE FASHION

The theme of waste in sustainable fashion has been highlighted a serious issue in various sustainable fashion theories, thus warranting considerable attention in this report.

Figure 2.1.1 Traditional Apparel Pipeline (Author's own, 2023)


Overview of Current Landscape

TECHNICAL APPROACH FOR SUSTAINABLE FASHION

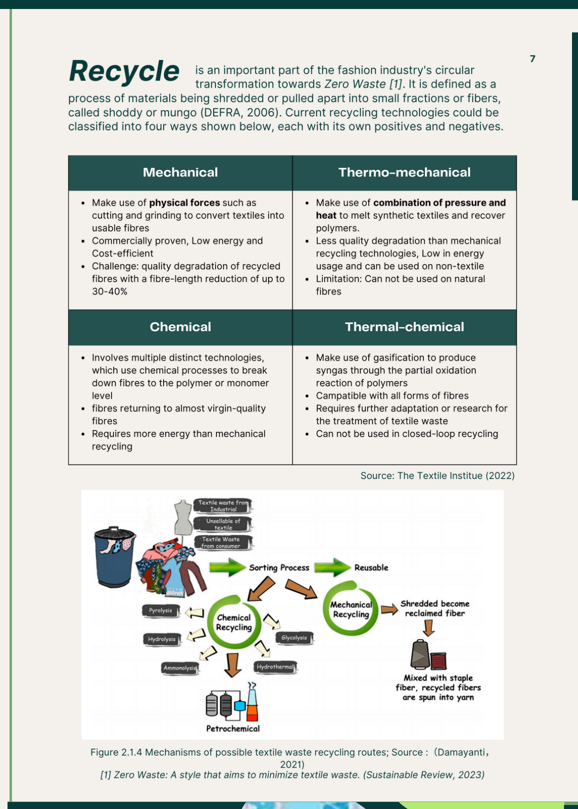
Figure 2.1 Theories of Sustainable Fashion (Author's own, 2023)

Figure 2.2 The main focus of previous studies in terms of sustainable fashion (Mukendi et al, 2020)


PRE CONSUMER WASTE
POST CONSUMER WASTE

Figure 2.1.2 Textile Scraps in Cutting Room

Figure 2.1.3 Textiles End Up In Landfills


Recycle

Mechanical | Thermo-mechanical | Chemical | Thermal-chemical

Figure 2.1.4 Mechanisms of possible textile waste recycling routes

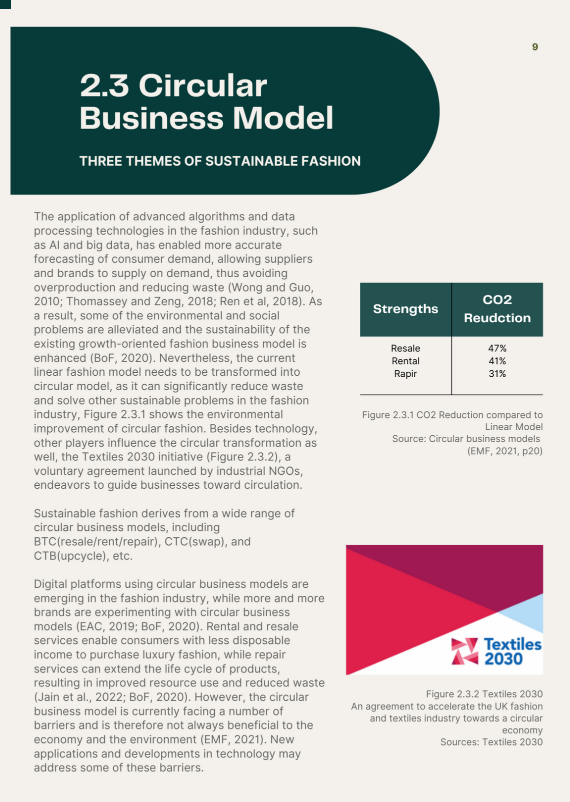

2.2 Sustainable Materials and New Forms of Fashion

THREE THEMES OF SUSTAINABLE FASHION

Technology aids the development of sustainable materials and products

Figure 2.2.1 Piñatex Leather from Pineapple Leaf Fibre

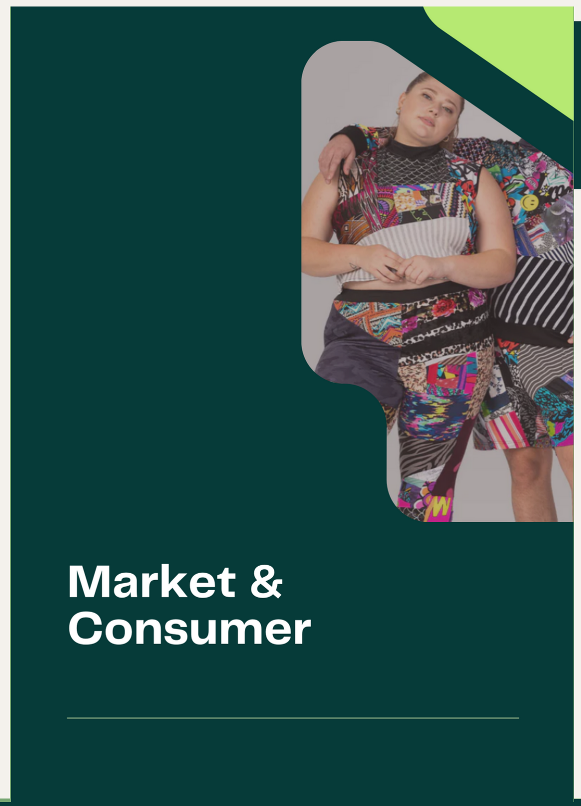
Figure 2.2.2: Louis Vuitton PFP-Like NFTs Rewards in Game APP

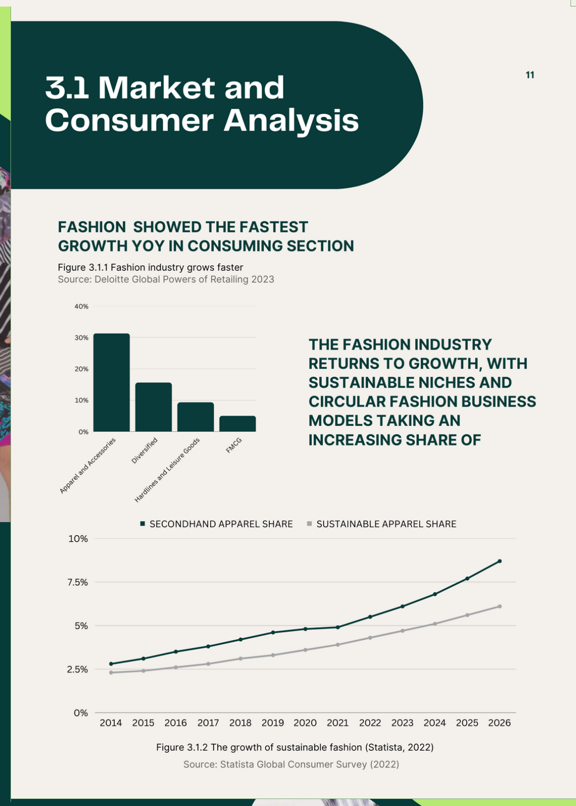

2.3 Circular Business Model

THREE THEMES OF SUSTAINABLE FASHION

Figure 2.3.1 CO2 Reduction compared to Linear Model

Figure 2.3.2 Textiles 2030

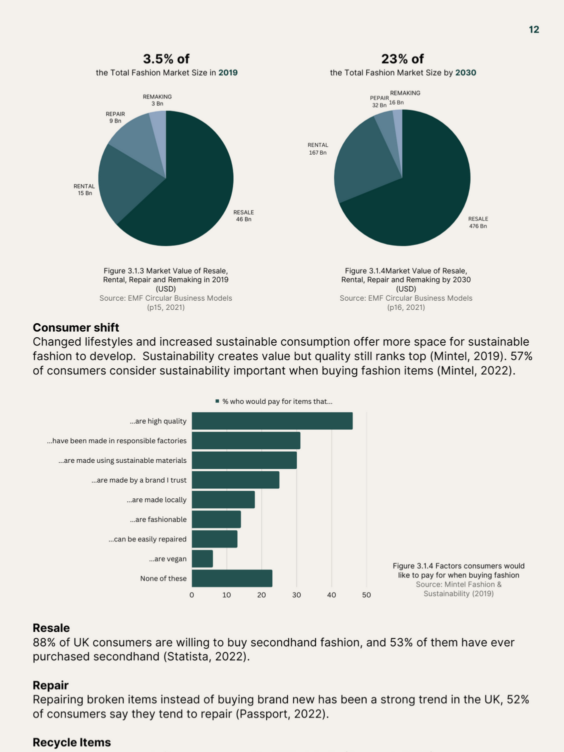

Market & Consumer


3.1 Market and Consumer Analysis

FASHION SHOWED THE FASTEST GROWTH YOY IN CONSUMING SECTION

THE FASHION INDUSTRY RETURNS TO GROWTH, WITH SUSTAINABLE NICHES AND CIRCULAR FASHION BUSINESS MODELS TAKING AN INCREASING SHARE OF

Figure 3.1.2 The growth of sustainable fashion (Statista, 2022)


3.5% of the Total Fashion Market Size in 2019

23% of the Total Fashion Market Size by 2030

Consumer shift

Resale

Repair

Recycle Items


3.2 Opportunities and Challenges

Opportunities

Align Sustainability with Marketing

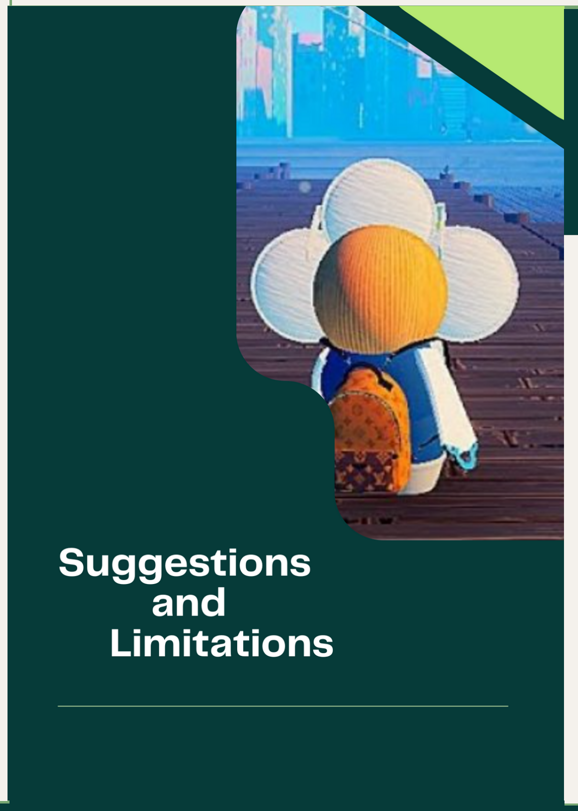
Reduce Costs in Sustainable Material Sourcing

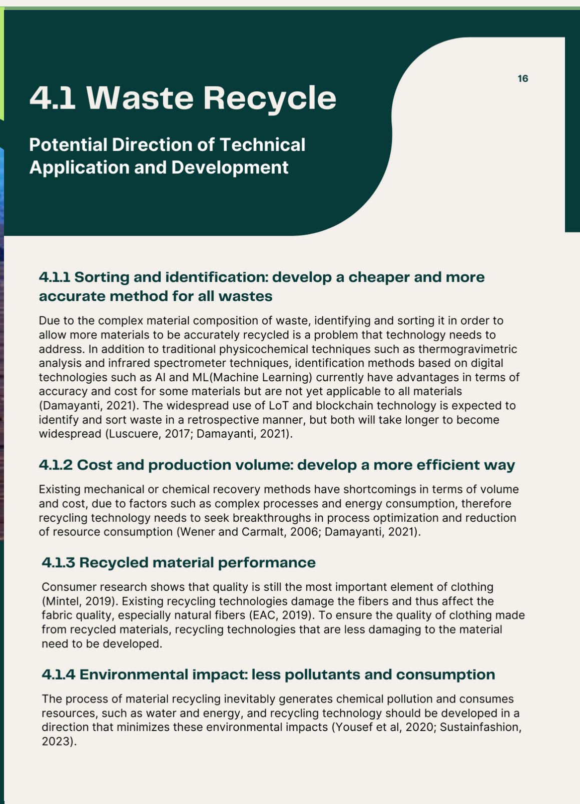
Extend in Consumer Journey and Customer Engagement


3.2 Opportunities and Challenges

Challenges

Difficulty in Sorting
Downcycling
Heterogeneity of waste textiles
Insufficient Supply
Incomplete Value Chain and Diseconomies of Scale
Difficulty in quantifying sustainability of circular fashion


Suggestions and Limitations


4.1 Waste Recycle

Potential Direction of Technical Application and Development

4.1.1 Sorting and identification: develop a cheaper and more accurate method for all wastes
4.1.2 Cost and production volume: develop a more efficient way
4.1.3 Recycled material performance
4.1.4 Environmental impact: less pollutants and consumption

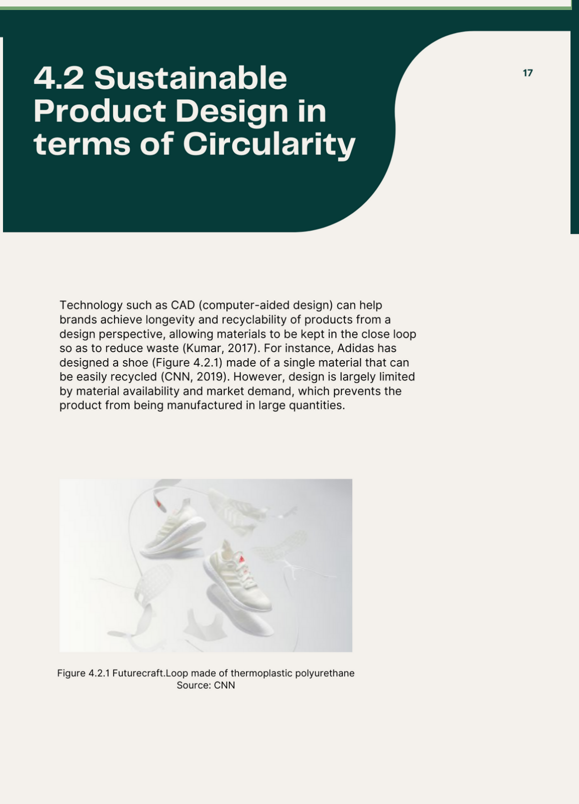
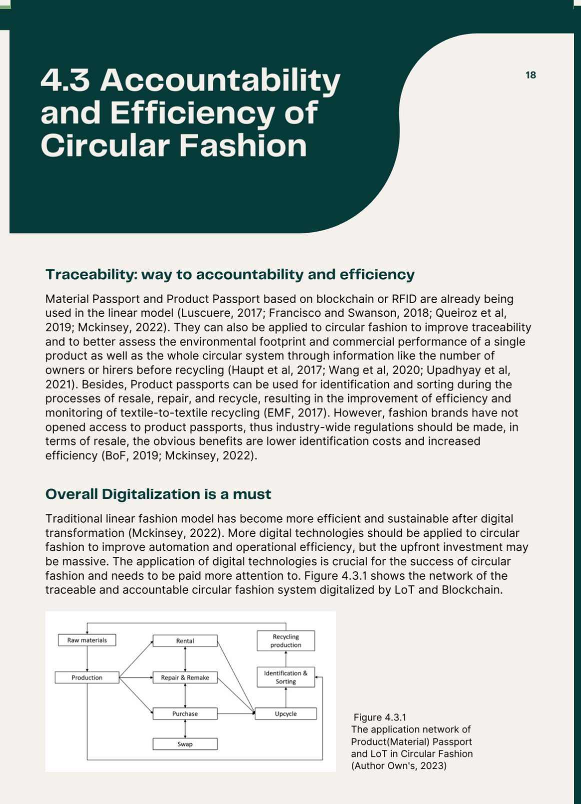

4.2 Sustainable Product Design in terms of Circularity

Figure 4.2.1 Futurecraft.Loop made of thermoplastic polyurethane


4.3 Accountability and Efficiency of Circular Fashion

Traceability: way to accountability and efficiency

Overall Digitalization is a must

Figure 4.3.1 The application network of Product/Material Passport and LoT in Circular Fashion (Author Own's, 2023)


References

MATS34802 Technology Project, University of Manchester

The overgrowth of the fashion industry in the past decades, dominated by a linear model, has led to many problems, making sustainable fashion a focus of both industry and academic attention. Sustainable fashion is a macro and multi-faceted subject, with technology being one of the key drivers in many of the approaches and practices towards sustainable fashion. This report discusses the current landscape and future of technology in sustainable fashion around a number of interrelated and inclusive themes. It is also worth noting that other drivers and players within and outside the fashion industry simultaneously influence the development and application of technology during the fulfilment of sustainable fashion.

Sustainability

Circular Business

Recycle

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