

VILNIUS UNIVERSITY KAUNAS FACULTY

INSTITUTE OF SOCIAL SCIENCES AND APPLIED INFORMATICS

International Business Management study programme

QASIM HAYAT

MASTER'S THESIS

**The Impact of Sustainable Textile Consumption on the
International Fashion Industry**

Kaunas 2026

VILNIUS UNIVERSITY KAUNAS FACULTY

INSTITUTE OF SOCIAL SCIENCES AND APPLIED INFORMATICS

QASIM HAYAT

MASTER'S THESIS

The Impact of Sustainable Textile Consumption on the International Fashion Industry

Scientific advisor _____

(Signature)

(Pedagogical and scientific degrees,

Name and surname)

Master's student _____

(Signature)

Handing-in date _____

Registration No _____

Kaunas 2026

Table of Contents

List of Abbreviations.....	IV
List of Figures	V
List of Tables.....	VI
INTRODUCTION.....	1
1. THEORETICAL ASPECTS OF SUSTAINABLE TEXTILE CONSUMPTION AND THE INTERNATIONAL FASHION INDUSTRY	7
1.1 Theoretical aspects of sustainable fashion consumption	7
1.2 Theoretical comparative analysis of slow (sustainable) and fast fashion	15
1.3. Sustainable consumption impact to the international fashion industry: theoretical model.....	17
2. EMPIRICAL ANALYSIS: SUSTAINABLE TEXTILE CONSUMPTION AND ITS EFFECTS ON THE INTERNATIONAL FASHION INDUSTRY	25
2.1 Contemporary consumption patterns and the expansion of secondary channels	25
2.2 Firm strategies and productivity trade-offs	29
2.3 Use-phase environmental impacts: per-wear CO ₂ e and microfiber emissions	33
2.4 Repair, habit change and socio-technical enablers.....	36
2.5 Governance, cross-border flows and distributional consequences.....	37
2.6 Integrative synthesis, research model and hypotheses	40
3. EMPIRICAL RESEARCH ON THE IMPACT OF SUSTAINABLE TEXTILE CONSUMPTION ON THE INTERNATIONAL FASHION INDUSTRY	46
3.1. Research Methodology.....	46
3.2. Analytical Framework: The Sustainable Consumption Impact Assessment (SCIA) Framework ...	48
3.3. Reliability and Validity Assessment	50
3.4. Data Analysis and Discussion of Results	52
3.5. Evaluation of the Research Results	58
CONCLUSIONS.....	63
RECOMMENDATIONS	65
SANTRAUKA	68
References	70
Appendices	83

List of Abbreviations

CO₂e - Carbon Dioxide Equivalent

EEA - European Environment Agency

EPR - Extended Producer Responsibility

EU - European Union

GHG - Greenhouse Gas (implied from "greenhouse-gas emissions")

LCA - Life-Cycle Assessment / Life-Cycle Analysis

RFID - Radio-Frequency Identification

SKU - Stock Keeping Unit

UNEP - United Nations Environment Programme

List of Figures

Figure 1. Theoretical Model: Circular Fashion Impact Model.....	18
Figure 2. Research Model.....	20
Figure 3: Research Model with Hypotheses	42
Figure 4: Sustainable Consumption Impact Assessment (SCIA) Framework — Diagram Explanation.....	60

List of Tables

Table 1.Key indicators to measure sustainable consumption impacts and industry productivity	10
Table 2.Enablers, barriers and observable actions.....	11
Table 3.Common firm responses to increased sustainable consumption	15
Table 4.Measurement priorities for per-wear accounting.....	19
Table 5.Key Indicators of Secondary Clothing Consumption Channels and Their Primary Drivers	27
Table 6.Synthesis of Key Research Findings on Sustainable Consumption Behaviors and Industry Impacts.....	28
Table 7.Strategic Options Adopted by Apparel Firms in Circular Business Models	30
Table 8.Comparison of Traditional and Circular Productivity Metrics in Apparel Firms.....	31
Table 9.Representative Findings from Per-Wear LCAs	33
Table 10.Laundrying Practices, Per-Wear CO ₂ e and Microfiber Implications.....	35
Table 11.Governance Mechanisms and Their Observed Distributional and Environmental Effects	39
Table 12. Demographic Profile of Respondents (n = 279)	47
Table 13. Internal Consistency Assessment	50
Table 14. Sustainable Consumption Practices Adopted by Respondents	52
Table 15. Mean Effectiveness Ratings of Sustainable Fashion Strategies (1–5 scale)	54
Table 16. Sustainability Importance and Second-Hand Frequency by Age Group	55
Table 17. Summary of Hypothesis Testing Results.....	58

INTRODUCTION

Relevance to the Topic. The fashion industry is a well-known source of dynamic inspiration, rapid changes and great impact on the economy. But, it has a lot of environmental and social impact that is not discussed much with its shiny appearance. The fashion supply chain, especially the textile division, has been extensively scorned for being resource-intensive processes such as excessive use of water, chemical pollution, and high emission of carbon, among others, while exploiting workers and creating waste. With greater awareness of these problems, there is now a need for sustainable consumption of textiles and a growing influence (Fletcher & Tham, 2019). Sustainable textile consumption - consumption of a textile produced, distributed, consumed and disposed of in an environmentally and socially responsible way (Niinimäki et al., 2013). These involve the use of recycled or organic fibres and fibre waste reduction, adoption of eco-friendly manufacturing principles and the promotion of reusability and durability through good design.

In recent times, the image of fashion has been undergoing a transformation around the world, with consumers looking for more transparency, stricter regulations and greater awareness. This thesis explores the impact of sustainable consumption of textiles in the international fashion industry and its implications, including in the production process, consumer behaviour, corporate responsibility and policymaking principles.

The purpose of this research is to give an in-depth understanding of how sustainability is not just transforming, but, indeed, redefining the norms and standards of global fashion, as per the analysis of trends such as ethical practices in labour, transition to circular economy models and inventions in sustainable materials (Ellen MacArthur Foundation, 2020), it is relevant to three intersections: environmental urgency, economic transition and social justice. Textiles and apparel also play a significant role in greenhouse gas emissions, freshwater consumption, chemical pollution and losses to aquatic environments, and consumption choices have a direct impact on planetary outcomes (EEA, 2022). From the economic perspective, the global fashion industry is a vast industry with its systems, sourcing, production and distribution location and channels constantly evolving due to the shifting demand for sustainable consumption, the rise of circular business models, and the pressure from regulations in key markets (Jia et al., 2020). Socially, the debates on sustainable consumption end up being interconnected with labor standards, informal re-use economies and inequitable access to resources, which makes consumption shifts distributive and

should be studied with care (Leal Filho et al., 2019). In this regard, investigating sustainable textile consumption's changing consumption patterns not only serves applied but also theoretical interests for a master's level investigator and is a direct lever for managerial, regulatory and civil-society interventions (Ellen MacArthur Foundation, 2020).

Problem Investigation Level. Although the majority of people are aware of the concept of sustainability and there are many campaigns that encourage sustainable and ethical fashion, the positive changes in the global fashion industry are not happening as fast or as intensive as they should be (Fletcher & Tham, 2019). Most of the market is still under the control of fast fashion, a business strategy that utilizes a speed-style clothing production model. Not only is it a model of overconsumption, but it also produces a great amount of waste in the form of discarded clothing; millions of tons of clothing are disposed of in landfills annually (Shen et al., 2021). Some fashion companies have created sustainability initiatives or even a “green” fashion line, but on a few occasions the initiatives have been superficial or applied to specific aspects. The new sustainable claims don't require brands to adopt different materials or labor practices, or restructure their production methods. This is not only deceptive for consumers, but also undermines trusted measures to encourage sustainability. The main problem here is that there is a gap between what companies and consumers want to do and what they actually do. Consumers have become more conscious of the need for sustainable products, but their behavior is not necessarily aligned with this consciousness as factors like price sensitivity, limited availability of sustainable options, and the dominating mark of fast fashion can all have different impacts. From the production side, some obstacles make it difficult to make sustainable textiles part of the mainstream fashion. Cost and Scalability: Sustainable materials and ethical practices tend to be more expensive, making it difficult for brands to scale sustainably while maintaining competitiveness on price (Niinimäki et al., 2013). Insufficient Infrastructure: Only two-thirds of the developing countries, where textile production takes place, have the technological support and regulatory frameworks to become sustainable. Supply Chain Complexity: So far tracking of textile raw materials and ensuring green and sustainable practices at every stage of raw material sourcing, from raw material to end product has been significant logistical challenge. To develop viable and scalable strategies, exploring the gap between sustainability ideals and realities is necessary (Fletcher & Tham, 2019). Such may be policy incentives, innovations on technologies in textile production, consumer education, and more accountability mechanisms in industries. Knowing the underlying reasons for opposing sustainable

integration will enable stakeholders to take steps towards systematic changes that would allow sustainability to become the norm and not just an option in the heart of the fashion industry (Niinimäki et al., 2020). This thesis takes a meso-macro perspective on the problem; it is not concerned with individual brands and households but rather with changes in the system at the international value chain and cross national level. That is, the study examines the interplay between (aggregated) consumer behaviour changes (such as buying more second-hand, renting, repair culture and preference for traceable materials) – and firm responses (product design, take-back schemes, pricing policies) – and policy instruments (waste policy measures, labeling, extended producer responsibility) – and measurable changes in environmental and socio-economic outcomes (Vassalo et al., 2024). The selected level of analysis ensures the thesis is able to connect micro-level consumption decisions to industry-level transformations, and be specific enough to make policy and managerial recommendations (Millward-Hopkins et al., 2023).

The Essence of the Problem. Despite ongoing efforts to awareness of sustainable issues, the textile industry is still mostly carried out in linear form. While consumers express interest in decreasing the amount of waste from their clothing, information and cost are hampering their actions, along with convenience (Balasubramanian & Sheykhmaleki, 2024). At the same time, companies encounter technical, economic and logistical challenges in adopting a circular approach and regulators struggle to establish multi-regional policies (Sandin & Peters, 2018).

The core research problem of this thesis is:

In the context of both firm-level constraints and regulatory constraints and consumer-level constraints, how does the circular economy practices play out in the textile industry?

The paper will examine the incentives, business models and governance that will reduce environmental and social impacts while not undermining sustainable trade and livelihoods.

The Object of the Thesis. This thesis aims on the effects of sustainable textile consumption on the international fashion industry. The research examines the impact of shifts in consumer consumption on the material flows, production methods and business models in the global fashion industry.

This thesis's primary objective is to investigate the impact of sustainable use of textiles in the international fashion industry.

Aim of the Thesis. The main aim of this thesis is to analyze the impact of sustainable textile consumption on the international fashion industry.

Objectives of the Thesis.

1. To synthesize recent literature on sustainable textile consumption and circular fashion, mapping dominant concepts and evidence gaps.
2. To quantify prevailing consumption patterns and secondary market growth in selected international markets through secondary data and material-flow indicators.
3. To evaluate policy and regulatory instruments, labeling, extended producer responsibility, and microfibre mitigation measures for their effectiveness and translatability across jurisdictions
4. To develop practicable recommendations for industry and policy actors that accelerate sustainable consumption while addressing equity and feasibility concerns.

These objectives are deliberately empirical and applicable: they produce outputs useful to managers and regulators while remaining within a master's timeline.

Thesis and Research Methods. A mixed methodologies will be utilized in order to triangulate the evidence and to increase the validity. A systematic literature review (2018–2025) will first be conducted to summarise and map existing peer-reviewed and authoritative grey literature and to identify measurement approaches (Domingos, Vale & Faria, 2022). Second, quantitative analysis will rely on existing public data on material flow and consumption in garment-making to calculate the impact on garment lifespan, recycling rates and secondary market penetration in two or three comparable markets (Millward-Hopkins et al., 2023; Sandin & Peters, 2018). Thirdly, the research conducted is from empirical study which is quantitative with questionnaires to 279 fashion consumers in the international markets.

Structure of the Thesis. This introduction is followed by three substantive chapters.

Chapter 1: Theory of the Framework introduces the basic principles of sustainable consumption of textiles and models of the circular economy. It presents the general domains (use-phase, design, after-use) and a conceptual model, which connects consumer behavior to industry outcomes. Chapter 2: Empirical Model and Hypotheses Summary and review of existing evidence on sustainable consumption patterns and firm strategies. Analyzes secondary markets and

environmental impacts and governance to develop a model of empirical research and testable hypotheses. Empirical Analysis and Synthesis:

Chapter 3 describes a mixed-methods research design. Gives quantitative and qualitative results, tests hypotheses and synthesizes results to come up with recommendations for industry and policy.

Literature Used in the Thesis. The thesis relies on mainly open access, peer reviewed literature and high quality institutional reports produced since 2018, such as systematic reviews, empirical research on circularity and consumer behaviour, policy briefs, and NGO analysis. The key scholarly sources are: a systematic review of textile circularity (Sandin & Peters, 2018); empirical life-cycle analyses of reuse and recycling; and studies on consumer behaviour addressing the attitudes-behaviour gap in sustainable apparel consumption (Sandin & Peters, 2018). The policy and practice perspectives are based on authoritative data and circular-economy frameworks from UNEP, EEA, and Ellen MacArthur Foundation (UNEP, 2018).

Theoretical Significance. The thesis aims to make a theoretical contribution by combining consumption-oriented behavioural approaches with circular economy and value chain approaches, filling a gap often left by studies focusing either on consumer psychology or production technologies. The research seeks to further develop theoretical expectations on the effects of demand-side change on supply-side decarbonization and circularity by testing the model's parts in a number of markets. This integrative contribution is especially important for the theory development in sustainable business models and socio-technical transitions.

Practical Significance. Empractically, the results will be used to provide managers with information on the most feasible and effective interventions to promote consumption, such as investing in resale markets or in durable design, and to inform policy makers on what type of measures to adopt for shifting consumption without disproportionately affecting vulnerable actors (Leclercq-Machado et al., 2022). Recommendations will be clear, including any trade-offs, implementation barriers and metrics for measuring progress and take-up by corporations, trade associations and regulators (Ellen MacArthur Foundation, 2020).

Scope and comparators The study deliberately focuses on international level dynamics, but it will also rely on two or three national markets as comparative cases, to illustrate how outcomes are shaped by the institutional context, as these cases will be selected to include markets with a high-

income EU market, a large North American market and a rapidly urbanising Asian market, thus having cross-contextual relevance (Millward-Hopkins et al., 2023). The scope of the literature and data will be contemporary: work from 2018 to the present will be prioritized, so as to capture current transitions and policy developments (Balasubramanian & Sheykhmaleki, 2024). The material scope does not cover industrial or technical textiles nor is it restricted to clothing.

1. THEORETICAL ASPECTS OF SUSTAINABLE TEXTILE CONSUMPTION AND THE INTERNATIONAL FASHION INDUSTRY

The chapter explores the theoretical underpinnings of sustainable textile consumption, unpacks definitions and steps of consumer behaviour in relation to sustainable consumption, outlines indicators for measuring textile industry-level impacts and productivity shifts, and conceptualises theory-based linkages between the demand-side shift to more sustainable consumption and the supply-side transformation of the global fashion system (Niinimäki et al., 2020).

1.1 Theoretical aspects of sustainable fashion consumption

Sustainable textile consumption is defined as the pattern of purchase, use and decisions at the end-of-life of apparel and other textile products that minimizes the environmental and social impacts throughout the product's life cycle, it includes both individual behaviors (e.g., repair, reuse, resale, and fewer purchases) and systemic measures (e.g., product redesign, circular business models and regulations). As it is in practice, the term points to a wide range of activities, operating across the clothing life cycle, and thus any valid theorizing needs to take this into account and acknowledge that consumption decisions are set in material design, logistics and institutional settings, not extra to them. It is usefully broken down into three interdependent domains: use-phase (frequency of wear, laundering behavior, repair practices); material and design (choice of fibers, durability, design for disassembly); and the after-use phase (involvement in re-use, donation, recycling, and proper disposal) (Laithla & Klepp, 2020). These domains form a staged and interactive process in that interventions in one domain influence the returns of action in other domains; for instance, the value of repair/market or resale market would be influenced by the value of durability design, and increase in value of durability design would lead to increase in value of repair/market or resale market, etc. (Laitala & Klepp, 2020).

The literature from a behavioral perspective highlights that people's attitudes towards the environment are important but not necessarily enough to facilitate long-term shifts in their purchasing habits unless combined with help to make them more convenient to have and make the information explicit and the economic offers more appealing. This observation prompts us to make

a second, no less important observation: sustainable consumption cannot be seen just as a psychological phenomenon but must be treated as an interaction between motives of individuals and the affordances of the institutions within which they consume. (Mandarić, Hunjet & Vuković, 2022) That is, whilst available services (repair shops, convenient take-back points, trusted resale platforms) can meaningfully affect willingness to repair/reuse, so too can price relativities between new and second-hand products, and signals of product trustworthiness (such as authentication of second-hand products or transparency from supplier) (Poldner, Overdiek & Evangelista, 2022)

Scholars who consider sustainable consumption as a process, tend to identify different stages: awareness, trial, habituation and advocacy; as each of these stages needs different kinds of interventions, such as information campaigns or platform incentives and convenience solutions. Importantly, the empirical literature records an attitude–behaviour discrepancy: despite concerns about the environment, many consumers still purchase frequently for reasons of price, fashion norms or convenience, creating a central challenge for explaining from the empirical side for policy and for firms as to why people act as they do. Hence, changes in behaviour are difficult to scale by moral means alone, and structural changes, such as better resale structures, honest labelling and lower repair costs, are typically necessary to motivate large numbers of consumers to adopt more sustainable practices (Nosratabadi et al., 2019)

Furthermore, generational and digital changes are influencing dynamics of sustainable textile consumption as younger generations and platform-native users have a greater inclination to embrace resale and rental models, thus creating pressure to change business models, logistics, and customer relationships for incumbent retailers. When technology and social norms have become aligned, digital platforms can lower transaction costs and offer trust mechanisms like ratings and authenticated listings that can help consumers move from a trial to a regular use of the platform, which can help the process of diffusion. Collectively these observations highlight the need for any theoretical analysis to consider consumption stages in the market and technological context as a way of understanding the co-evolution of supply and demand, and the opportunities for policy and managerial interventions to be more effective (Poldner, Overdiek & Evangelista, 2022)

Key constructs, barriers and enablers. Other constructs keep coming up repeatedly in the literature as conditions that are crucial for understanding why and when sustainable textile

consumption takes off: perceived product value, trust in hygiene and quality (particularly of used products), price sensitivity, availability of convenient services (such as service for repair, rent, take-back etc.) and transparency of supply chains. Perceived product value, for example, is not just monetary, it is also symbolic and functional and forms part of a consumer's evaluation of whether a piece of clothing will retain its aesthetic beauty and structural integrity with time or not, and this will influence their willingness to pay for durability or for authentic second-hand products. In resale and rental markets, concerns about hygiene and quality are especially significant, since the adoption may be stifled by the worry of cleanliness and wear and fit of the fabric (Tymoshchuk, Lou & Chi, 2024).

Common barriers are entrenched fast-fashion norms, low relative prices of new garments that do not compete with second-hand garments, limited repair skills and services in many local areas, and uncertainties about the environmental net benefits of circular services (rebound effects or extra logistics emissions). In contrast, key enablers are credible labeling and traceability systems, reducing information asymmetry, strong resale platforms, reducing transaction costs and ensuring authentication, normative shifts supported by peer groups and influencers, and policy incentives that internalise end-of-life costs for producers, making circular design a more attractive option. Context is crucial: A rent-to-ware strategy that cuts per-wear emissions in dense urban areas may have a negative effect in areas where the carbon intensity of shipping the textiles over long distances and cleaning them multiple times increases per-wear carbon emissions, and the same intervention may have a positive effect in some areas while a negative effect in others. Thus, context sensitivity is a key aspect of effective intervention design, as well as of avoiding unintended impacts (Amasawa et al., 2023).

Key metrics and productivity indicators of industry. In order to measure the sustainability impact of textile consumption on the international fashion industry, an integrated material-flow, environmental, economic and business-model indicator set was used for this thesis, which together reflect both the ecological performance of the industry and the productivity change of the sector. Material-flow indicators represent metrics that describe the movement of textiles in the system, including the number of units of garments produced and sold (garment throughput), the number of wears/years that garments are in use (average active lifetime), and the percentage of garments sent to the reuse, repair, or recycling stream (proportions redirected to reuse, repair, or recycling

streams) (Textile Exchange 2023). The most relevant environmental metrics for primary interest are the greenhouse-gas emissions per functional wear, the water footprint and the release of microfibres during laundering and wear (Klepp et al., 2020). Economic indicators are related to the market share of resale and rental channels, revenue per SKU over its lifetime, inventory turnover, and cost impact of product-as-service models on gross margins and logistics requirements, which reflect the changing nature of consumption and reconfiguration of firm performance accounting. In terms of productivity, the usage rate (time spent producing a garment as a percentage of the total time) of the system, the turnover efficiency (sales made per square metre or per SKU) and the resource productivity (value of the product per kg of fibres used) are among the measures commonly used, and they reflect the impact of consumption patterns on firm output given the amount of resources used. (Al-Halbousi and Ali, 2021).

Table 1: Key indicators to measure sustainable consumption impacts and industry productivity

Category	Indicator	Unit / interpretation	Typical open data source
Material flows	Garment throughput	units/year; trend over time	National trade statistics; Textile Exchange reports
Use-phase	Average wears per garment	number of wears per item	Wardrobe survey datasets (Klepp et al., 2020; Laitala & Klepp, 2020)
Environmental	CO ₂ e per wear	kg CO ₂ e per wear	LCA inventories and academic LCA studies
Pollution	Microfibre release	fibres per wash or g per wash	Environmental journals and datasets
Market	Resale market share	% of market value	Market reports; MDPI empirical studies
Business model	Rental utilisation	avg wears per rented item	firm disclosures; case studies

The indicators have been organized in groups that represent measurable system outputs of consumer practice, and typical open data sources are identified that allow researchers to easily identify them for cross-national comparison, such as data from wardrobes surveys that directly provide empirical estimates of average wears per garment, which can then be applied to calculate per-wear CO₂ when combined with LCA inventories; other examples include trade statistics and industry reports, which provide the denominator for estimating market shares and throughput trends. With these indicators, the researcher can be able to answer integrative questions, such as if there is a correlation between the share of resale products and the average wear and the emissions per wear in a specific market, and whether other contextual factors, like frequency of laundry, have an impact on the relationship between these indicators. (Klepp et al., 2020) (Textile Exchange, 2023).

Due to the variations in policies and firm strategies, it is helpful to have another set of indicators that explicitly track interventions, and Table 2 below summarises typical enablers and barriers along with the observable firm or policy actions that correspond to them.

Table 2: Enablers, barriers and observable actions

Domain	Enabler	Barrier	Observable firm/policy action
Information	Labelling & traceability	Greenwashing; info overload	QR codes; blockchain traceability pilots
Convenience	Local repair & take-back	Absence of services	Brand take-back points; third-party repair networks
Economics	Subsidies / EPR incentives	Low price of new garments	EPR fees; tax incentives for recycled content
Social norms	Influencer & peer endorsement	Fast-fashion norms	Campaigns; resale platform partnerships

Table 2 connects abstract enablers and barriers to the observable and measurable actions that can be taken and assessed; e.g. the availability of QR-based traceability is observable and can

be measured by the number of SKUs that carry a digital ID, the number of certified repair outlets can be used to approximate the availability of a local repair service, and brand-reported volume of repairs is measurable and serves as an input to policy design. (Textile Exchange, 2021)

Individual choice cannot be taken as the sustainable consumption of textiles. Rather, it needs to be understood as a socio-technical issue, and consumer behaviour, business models and flows of materials and regulatory frameworks together lead to either wasteful or circular results. Systems thinking demonstrates that minor modification in one segment of the system can hardly bring about substantial gains to the environment due to other components of the system either moving in their direction or responding back. For example, higher quality fibre can be overwhelmed by higher volumes of production and more active resale platforms can be constrained by weak reverse logistics and bad design products to be reused. This complexity is confirmed by empirical data of the market: the expansion of the worldwide fibre production and material flow has been ongoing, and any theory should comprise demand-side forces and upstream supply-side incentives as well as downstream waste channels (Textile Exchange, 2023).

The accounting of material flows, per-wear accounting and core metrics. One of the moves that can be made is to make material flows not only dependent variables, but also practical theoretical ones. Per-wear accounting, garments' lifetimes and the percentage of textile that is not used for consumption but is re-used or recycled are all moving from abstract behaviour to measurable impact on the environment. While single garments can be produced sustainably, an increase in number of wears per garment leads to a significant decrease in the environmental impacts per functional unit, while a decrease in useful life leads to a significant increase in the per-use factors. The huge amounts of wastes and low recycling rates indicated by quantitative indicators push theory towards notions that can be considered workable, such as "intensity of utilisation" and "circular retention", which can be quantified at market and product level(s). Theorists should therefore link psychological and institutional factors to such material actions as modelling the impact of an integration of the price signal, service and product design on the average wears and end-of-life routing (Bato and Kašáková, 2025).

The behavioral models should not be abandoned although; they should be incorporated within the socio-technical descriptions that elaborate on the reasons behind the inability of intentions to become habits. There are also some variations on trial behavior that psychological

constructs can predict when considering attitudes, norms, perceived control, but the lack of a repair service, the absence of any secondhand route that can be trusted, and the economic convenient factor often prevail over the repeat decisions. Research recently conducted on the economics of repair, rental and reuse shows that circular solutions only benefit if a range of enablers are achievable, including low cost logistics, easy-to-access information on products and seamless returns. Infrastructural affordances therefore, in theory, moderate behavior change; if infrastructure is enabling, individuals' motivations will have more influence on behavior change. That reconstructions involve credible hypothesis: for instance, if a trustworthy fit aid and the low-cost mending allowances can increase mean active life of clothing across the urban cohorts, then reconstructions carry this (Frontiers in Sustainability, 2022).

The dynamics of the market, platform and resale. The market theory and platform economics describe the stalling and scaling of resale, rental and authenticated second hand markets. Platforms lower the search costs, provide verification and aggregated supply that lower transaction costs, and potentially change consumer norms in regards to second-hand consumption. But the increase in platforms does not always result in circular outcomes: logistics and standardization of product information is required and in many instances there is a lack of clarity of regulation on the cross-border flows scale. The studies on the national markets have reported a significant amount of used textiles and a considerable amount of diversion to reuse where the collection and sorting system is good; where the system is also poor, the amount of the secondary flow is exported and/or downcycled, and benefits to environment of limited case. Conceptually, it implies that platform affordances can either reduce the per-wear impact of systems at the system level or merely serve to close user groups (WRAP, 2021).

Governance and policy levers: theory to instruments. The policy theory takes centre stage since the governance alters the rules of the game to consumers and firms. Instruments like extended producer responsibility, labelling schemes, product specifications and fiscal incentives change relative prices, change risk perceptions and result in infrastructure investments. The recent OECD publication on EPR in garments highlights the fact that policy can be designed to support separate collection, or to improve sorting and enhance the effectiveness of policy depends on design considerations, who pays, measuring outcomes and implementing trade rules in line with the goals of circularity. Theoretically, governance can be a system-level intervention, with feedback loops:

regulation creates firms experiments, firms change product design/service offers, consumer expectations change. Theories drawn from this perception are empirical: supporting EPR with subsidies on the infrastructure of the reuse will lead to more reuse and re-wear than would the influence of each of the instruments individually.

Means, methods and context of intervention design. Clear and mixed strategies of assessment are key indicators of a strong theory. The quantitative parameters should also include per-wear emissions, the average active life, proportion of material reused as textile-grade inputs and the quantity of material reused rather than being disposed of in landfills or delivered to the burner. These should be complemented by a survey of wardrobes at the house, a survey of transactions on the platforms and a survey of costs and logistics at the firms. Using scenario modelling to project likely outcomes by 2035 can be used to leverage consensus estimates of efficiency gains and the policy mixes, making it a viable route to policy package comparison and to consider the job-exporter-expenditure trade-offs; and makes scenario modelling a useful tool in this context. The thesis should then be able to support causal pathways using the methods of natural experiments and pilot interventions or comparative case studies, rather than just attitudinal change (Ogilvie et al., 2020) as material outcomes.

Sustainable textile consumption is understood as a set of consumer decisions and systemic measures, which, when taken together, minimise the environmental and social impacts of clothes throughout their use and life cycle, both in the purchase and when they reach their end-of-use. The concept is then broken down into three interdependent domains which are presented as an ongoing process rather than as distinct categories: use-phase, material, and after-use; use-phase, material; design and after-use. During use, the frequency of wearing, washing and repair of garments is considered, and wear and wash frequency and garment repair practices are demonstrated to have material impacts on the per-worn environmental intensity of garments; thus, minor changes in how garments are used on a daily basis can sum up to significant system gains when widespread. The material and design domain is defined as the "lever" that defines the downstream possibilities. Policy and firm decisions in these areas strongly influence consumer options to repair, resell and recycle garments, with choices being made on the basis of fibers, construction quality and design for disassembly.

1.2 Theoretical comparative analysis of slow (sustainable) and fast fashion

The most common typology of demand side practices are reduce (buy less), repair (extend use), reuse/resale (transfer ownership), rent (temporary access), and recycle (material recovery). Exercise of each practice is followed by firm responses, such as increased uptake of resale leading to increased uptake of the brand-owned resale channel and authentication services; and increased uptake of repair encouraging modularity and repairability (Zhang & Hale, 2022). Depending on the size, brand positioning and complexity of supply chains, firms adopt varying strategies to product redesign for durability, including product-as-service, partnering with resale platforms, and introducing take-back systems and transparency tools like digital IDs or QR codes (Azad, 2025). Empirical case studies reveal that resale and repair pilots by the incumbent can be followed by short term revenue cannibalisation and long term loyalty and lifetime value when the offerings are integrated and supported by logistics systems (Poldner, Overdiek & Evangelista, 2022).

Table 3: **Common firm responses to increased sustainable consumption**

Firm response	Description	Expected productivity / competitiveness effect
Durable design	Higher quality materials and construction	Fewer SKUs sold but longer revenue per SKU
Brand-led resale	Official second-hand channels	Captures resale margin; preserves brand control
Product-as-service	Rental/subscription models	Higher utilisation; new logistics cost structures
Take-back & recycling	Collection for reuse/recycling	Material cost offsets; depends on recycling tech

The relationships between consumption shifts and industry productivity (Table 3). Utilisation and value-retention mechanisms connect consumption changes to measurable industry productivity, and an analytical shift towards per-wear environmental intensity reveals trade-offs: a decrease in purchases with an increase in average wears per garment will result in a decrease in emissions per garment, but, if the saved money from that decrease is invested in further purchases

(the rebound effect), net environmental benefits may be undermined (Persson & Hinton, 2023). Likewise, rental systems increase utilisation by spreading out a single garment's environmental impact across numerous users, but when utilisation is low, the added logistics and cleaning emissions can negate the benefits (Amasawa et al., 2023). Empirical studies and life-cycle studies show that the reduction in production volumes, increase in the use-phase and increase in domestic recycling rates will create the greatest impact for the environment, and that the increase in environmental impact due to the use of these three factors will lead to the change of productivity indicators in firms, such as revenue per SKU becoming a more relevant decision criterion than the turnover velocity (Textile Exchange, 2023). Therefore, it is expected that the productivity profile of a successful organisation that transitions its business from a high turnover, low margin to a lower turnover, higher lifetime value will be different – with lower volume but higher value per unique product and potentially higher productivity of its resources (Nosratabadi et al., 2019).

Systemic feedbacks, distributional impacts and governance. There are three systemic feedbacks relevant for industry outcomes: market feedback (consumer norms affect the design decisions), technological feedback (investment in recycling or durability technologies reduces the cost over time) and regulatory feedback (policy instruments change relative prices and incentives over time) (Schumacher & Forster, 2022). Second-hand and recycling markets are often global, and the export of low quality used textiles can benefit the livelihoods of communities in developing nations as well as those in the exporting nations, but can also result in waste for the destination country's textile industry unless well managed (Global Fashion Agenda, 2019). Hence, governance mechanisms such as labelling standards, minimum durability standards, extended producer responsibility (EPR) schemes and promoting local recycling capacities play a key role in aligning private incentives with sustainability objectives for textiles (Textile Exchange, 2021). It is clear from evidence that policy design is important: poorly designed EPR systems can make compliance more expensive without securing circular material recovery; while dedicated durability standards and design-for-recycling incentives can have the effect of changing the incentive of firms towards longer-lasting products (Modulated fees for Extended Producer Responsibility schemes (EPR), 2021)

1.3. Sustainable consumption impact to the international fashion industry: theoretical model

This Section combines a multilevel framework that draws on the fields of consumer behaviour (attitude–behaviour gap, stages of adoption), circular economy and business model innovation, and it contends that the per-wear metric is most relevant for policy in the context of linking consumption to firm productivity and environmental outcomes (Klepp, 2020). The novelty of the theory is thus explicitly illustrated by modelling the link between consumer practices (reduce, repair, reuse/re-sale, rent, recycle) and firm performance measures via the mediation of utilization and value-retention, making this model directly testable with measurable indicators (Carney Almroth et al., 2018). The model highlights that with utilisation as the intermediary variable, it is possible to shift the conversation from simple volume-based metrics to more meaningful metrics of environmental impacts per unit of service per SKU (Sandin & Peters, 2018). The model also incorporates the behavioural adoption stages of awareness, trial, habitualisation and advocacy, to enable representation of short-term pilots (such as a brand-run resale trial) that can yield very different long-term results, depending on whether the trial ultimately leads to successful habitual re-use or not (Scarborough et al., 2024). Furthermore, the concept of per-wear impacts relies on the use phase dynamics (how often clothes are washed, how they are worn, how they are repaired), which is in line with life cycle assessment results on laundering and microfiber release to fully account for the most significant and/or often-overlooked impact channels when assessing per-wear impacts (Khumorikov, 2025). On the practical side this synthesis creates a concise and compact list of measurable parameters average wears, resale penetration, utilisation rates, per-wear CO₂e and microfibre release that has a broad enough scope to be comparable across nations and is detailed enough to provide policy levers and firm strategy (Textile Exchange, 2023). To sum up, the theoretical contribution is represented by (a) operationalizing utilisation as the link between consumption and firm productivity, (b) embedding the adoption stages to capture dynamic change, and (c) identifying a small number of high-value indicators, making comparative empirical work and policy-relevance possible (Nosratabadi et al., 2019).

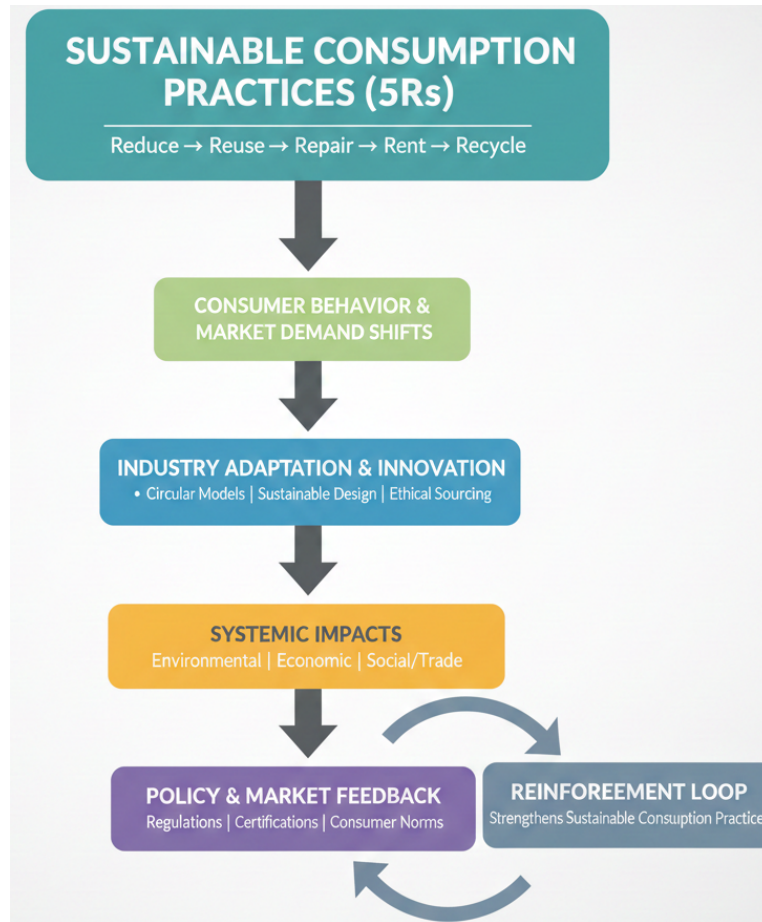


Figure 1. Theoretical Model: Circular Fashion Impact Model

Consumers' behaviours can be categorized into five main types that reduce, repair, reuse/resale, rent and recycle, which can be used to illustrate the relationship between individual behaviours and the resulting firm actions such as durable design, brand-led resale and product-as-service. The strategic actions taken by firms at each practice are different, and these vary based on size, positioning and supply-chain complexity. More resale/repair activity may also push incumbents to test second-hand channels and authentication mechanisms, albeit at the risk of revenues cannibalising in the short term. Environmental intensity measured on a per-wear basis also brings into view systemic trade-offs: rebound effects or low rental utilisation can result in unintended outcomes. The life-cycle evidence suggests, therefore, that the highest environmental and productivity impacts will be achieved through a series of combined measures that reduce production volumes, lengthen use-phases and enhance domestic recycling rather than through a series of standalone measures.

The chapter also recommends a measurement-priorities table for empirical implementation, outlining methods for data collection and preferred open data sources for replication and comparative analysis, to support this (WRAP, 2021).

Table 4: Measurement priorities for per-wear accounting

Indicator	Operational definition	Preferred collection method	Preferred open data sources
Average wears per garment	Mean number of wears per item over a defined period	Harmonised wardrobe surveys; passive wearable-logging	National survey repositories; researcher datasets
Resale penetration	% of market sales value transacted via resale channels	Platform transaction data; market reports	Open platform APIs; MDPI market studies
Utilisation rate	Avg days/period garment is in active use	Diary studies; RFID tracking	Pilot datasets; firm case studies
Per-wear CO ₂ e	kg CO ₂ e divided by average wears	Link wardrobe data with LCA inventories	Open LCA databases; academic LCA studies
Microfibre release	g or fibres per wash, per item	Laboratory washers; standardized tests	Environmental journals; public datasets

The concept of per-wear is abstract and has been operationalized in Table 4 by providing measurement protocols and directing researchers to data sources they can access; for instance, average wears per garment can be obtained from a harmonized wardrobe survey which asks respondents to report on the frequency of use in recent times, or from passive logging (RFID or a diary app on smart phones) which, because it significantly reduces recall bias, can enhance the quality of per-wear CO₂e estimates (Klepp, 2020). Similarly, the use of wardrobe data needs to be combined with a LCA inventory for the garment type and fibre combination, and the table therefore suggests standardised LCA datasets and clear allocation rules, in order to enable meaningful and valid cross-study comparisons (Millward-Hopkins et al., 2023). Importantly, standardized lab

protocols should be used to measure microfiber release, and the number of releases should be reported per wash or per wear—this is because the results can vary from one test to another, and it can make a material difference in the conclusions reached by policies regarding the benefits of recycling versus reduced use (Khumorikov, 2025).

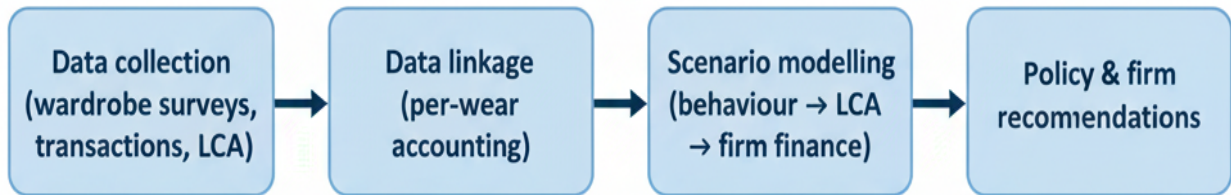


Figure 2. Research Model

The **Research Model (Figure 2)** outlines data collection processes, ranging from wardrobe surveys to platform transactions and LCA inventories, to per-wear data linkage for accounting purposes. Scenario modelling involves looking at behavioural patterns and interpreting them into environmental and financial consequences to inform policy and make robust recommendations. The method is connected to consumer activity and sustainability and the productivity of industry.

Impact of sustainable consumption on the international fashion industry. Sustainable consumption can alter the economics of a specific industry by affecting the linkage between product turnover and the extraction of value, that is, the more a customer uses the product, the lower the cost per unit of value extracted and the more services one product can provide, the lower the environmental cost per unit and the more new opportunities to explore alternative revenue models (such as resale, repairs, subscriptions, loyalty schemes). This change is important since fast-sku velocity is the driver of margins in the international companies based on high-frequency new-style release; any sustained rise in utilisation lowers the need to have new-product releases constantly and so squeezes the structure of margins of participants of the fast-fashion sector and enhances lifetime value of the brands that seize after-market value. Empirically, resale and access services are surging and they transfer the value along the chain, resale sites reveal higher willingness-to-pay for authenticated, durable goods, and these reassign part of the profits of the

initial sale into repeat services debts or resale fees. Exporter countries are affected by the two-sided implication and benefit from the producers. Annually, on the one hand, the increase in circular consumption in destination markets can decrease the volumes of new imports and put pressure on the export volumes and force producers to identify more value or services, which, on the other hand, introduces new service opportunities (take-back, the repair, certified pre-owned lines) that create a need on suppliers with quality control, traceability systems, and reverse-logistics partners that can be exported as a service and standard instead of individual finished garments only (Brooks, 2025).

More specifically, changes in consumption activity have measurable effects on the ratio of inventory and working-capital, important for the firms and lenders of finance. On the other hand, if the firms increase their utilisation rate or the penetration of resale is high, the positive effects of fast turnover are mitigated by the possibility of slower but higher-yielding asset utilisation, reducing the risk of markdowns and eliminating the need for aggressive discounting, but introducing increased initial investments in design, product traceability, and take-back logistics that shift the capital allocation and risk distribution between producers and brand owners. Buyers will react: Lenders can be interested in different sorts of collateral (platform transaction history, certified repair networks) and institutional investors can cover demonstrated per-wear enhancement, but transition risks are encountered by companies, who can't turn a corner of the building on a dickens. Therefore, sustainability restates the concept of competitiveness: companies that will integrate sustainability onto their products – including durability, services and after-market capture – will be able to keep their margins and even boost their overall return as the total volume of new products decreases.

Impacts on supply chains, material and design choices. The sustainability of the consumption has an impact upstream of fiber selection, product design, supplier capacity because what is reusable, fixable or reusable is limited by design and material; the demand becomes an incentive to redesign supply chains to respond to demand side changes (Mazzitelli, Papile and Del Curto, 2024). Each individually, the rise in consumer demand for resalable and durable clothes can drive a reorientation of the design of the clothes that allows the sorting and recycling process to be realistic and reasonably priced, thus influencing the raw-material demand and trade on a global level. If traceability and certification are important to the resale value, brands are more likely to

choose suppliers that can provide them with digital proof of traceability and greater quality tolerance. As a result, less profitable suppliers will be forced out and more vertically integrated or suppliers that are more capable will benefit and change the comparative advantage within the producing nations. Additionally, unit economics fundamentally shift with design-led circularity—when the value is captured downstream through either resale or service, a small increase in the cost of manufacturing a modular or reparable garment can be returned to the garment's value (Ostojic and Traverso, 2024).

The systems perspective implies that the industry shifts towards a layered system where product design, digital verification, aftermarket and reverse logistics become strategic business assets: Aftermarket businesses can reduce waste in the supply-chain, secure the aftermarket margins as volume-based businesses are pushed by competition and regulations to the margins. It is also changing the relationship between suppliers and customers: they will be looking for companies to conform to design-for-circularity, traceability and repairability indicators, forcing companies to invest in new technologies and staff training in specific regions. After all sustainable consumption is not just a downstream option that it is an option followed by a demand shock that re-arranges the supply side investment, patterns of trade and techno adoption in the global fashion sector.

The flow of trade, second-hand markets, and the geopolitical dimension. The impacts of sustainable consumption on international flows are multiple: a rise in reusing locally will reduce the amount of new imports while it will increase the trade of certified second-hand products between countries, but a rise in collection and recycling in consuming countries will reduce the amount of used exports that previously served lower income markets (Mdeazitelli, Papile and Del Curto, 2024). The size of the second hand market is massive and politically sensitive decisions on how to determine exports (e.g. tighter interpretation of the Basel Convention) are meant to stop waste dumping but could also wipe out incomes on markets where cheap second hand products are the basis of their operations; political decisions therefore have significant environmental (as well as social-economic) impacts (Panju, 2024). The volume and possible pressure on price for the new garments exporting manufacturers would be affected in the case of reduction in the markets of destination; but new service exports (pre-owned authentication, sorting technology, remanufacturing) are also emerging in the resale business, and there is a great potential to be

captured by flexible manufacturers. Consequently, sustainable consumption will be intertwined with trade policy and development outcome: policy makers will have to consider the domestic capacity for recycling, the number of jobs in the second-hand industry, the social value of the second-hand imports to the poor consumers, and global coordination and transitional support will be indispensable in this respect.

This process becomes even more modular when it comes to the geography of the production and reusing of clothing on an industrial scale. Areas dedicated to higher value refurbishment / certified second-hand processing and retooled areas for spin mono-fiber / buffer manufacturing quality finishes to promote circularity. The above-mentioned changes indicate a possible development of comparative advantage and require a selection of investments in logistics and standards along with a transition of policies in the volume export dependent areas.

This section defines the ways changes in the daily wear and tear of clothes – whether through longer usage, mending, or re-selling and renting – amplify into the global fashion system. It puts utilisation (average wears per garment) in the middle, revealing the reduction in environmental impact per use and the alteration of firm economics due to increases in utilisation. Thus, the brands have to re-engineer their products, implement take-back and resale services, and rework their supply chain. This is then determined by policy and infrastructure and how quickly these change. In brief, the section is connecting household actions with firm strategy and trading returns with a lucid and testable theoretical model. The first theoretical chapter aims to give a theoretical basis to the understanding of the influence of sustainable textile consumption on the international fashion industry. An ethical decision by an individual consumer is not the only way to give sustainable use of textiles; it is a multi-faceted socio-technical challenge that links consumer behaviour, product design, business models, material flows and regulation.

The chapter demonstrates that sustainable consumption is observed at all stages of the garment life cycle, from the initial purchase through usage, to laundering, repair, resale, rental, recycling and end of life. An important conceptual advance in this chapter is the focus on garment use (how many times an average garment is worn) as the primary mechanism between consumer behaviour and environmental and industry impact. The more a garment is used, the less impact it has on the environment, as long as there are enough controls in place for the added impacts of

laundering, logistics and rebound consumption. The chapter also shows that there are new challenges in fast to slow and circular fashion, not only in terms of consumer attitudes, but also infrastructure, market incentives and governance. There is still a big gap between the theory and the actual behaviour of consumers as they may express concerns about sustainability issues, but their actual behaviour is often limited by price, convenience, limited repair services, lack of trustworthy resale platforms and the appeal of fast fashion.

Hence, sustainable consumption of textiles needs to be enabled by verifiable labelling, availability of repair solutions, re-sale and re-rental services, as well as the design of the product and policy instruments like EPR. Overall, the theoretical analysis forms the basis for a multi-level model of consumer behavior, firm strategy, and firm governance that interact to redefine productivity, competitiveness, and environmental performance of the global fashion industry. The chapter therefore establishes a logical framework for empirical research in the form of identifying key constructs, causal pathways and measurable indicators to evaluate the impact of sustainable textile consumption on the international fashion system.

2. EMPIRICAL ANALYSIS: SUSTAINABLE TEXTILE CONSUMPTION AND ITS EFFECTS ON THE INTERNATIONAL FASHION INDUSTRY

This analytical chapter brings together and critically reviews empirical evidence revealing the impact of reduced, repairing, reselling, renting and recycling behaviors on firm strategies and the cumulative productivity effects at industry level, as well as the interaction with environmental outcomes like per-wear greenhouse-gas emissions and microfibre release. Characterizes the current consumption patterns and development of secondary channels, analyzes the way firms respond to them strategically, and their productivity trade-offs, describes use-phase environmental impacts (per-wear accounting, laundering, microfibre emissions), examines repair processes and changes in use habits as socio-technical processes, and discusses governance, cross-border flows and distributional impacts.

2.1 Contemporary consumption patterns and the expansion of secondary channels

In the past 5 years, the world has noticeably changed with the emergence of new secondary channels resale platforms, rental services and neighbourhood repair networks are now spread all over the world, diversifying their reach (Klooster et al., 2024). The resale of products mediated by digital technologies has gained significant momentum due to its ability to decrease the costs associated with transactions between households and its potential to implement authentication systems that minimize the perceived risk of transactions, thereby enhancing conversion and repeat use (Negash & Akhbar, 2024). Where logistics and area returns allow it, formal rentals have been introduced and have proven to be a viable business for occasion-based products, like formal wear (Monticelli & Costamagna, 2023). Aggregate data is less revealing about repair activity, although ethnographic and survey data shows localized streams of high repair intensity that are enabled by local skill networks and price subsidies for re-use (McQueen et al., 2023). Combined, these channels expand the range of available ways for consumers to access the clothing service, and thus alter the denominator in per-wear accounting: platforms or services that expand the average number of wears per garment change the environmental intensity per service as long as other behaviours (e.g. laundering frequency) are kept in check (Lant et al., 2020).

Empirical evidence also suggests that there are demographic and geographic differences in the adoption of resale, rental and repair. Younger groups are more open to resale based on social signalling, not as much stigma, and knowing how the marketplace works, whereas older groups are more likely to resale when credible quality assurances and trust signals are present (Murtas & Pedeliento, 2025). There has been little change in price sensitivity and perceived value within cohorts, which accounts for the fact that environmental concern has not consistently been a predictor of actual uptake (Halicki et al., 2024). According to the results of choice experiments and panel surveys, the presence of authenticated histories and quality information increases the willingness to purchase second-hand goods, while the perceived hygiene risks and fit uncertainty decrease the demand for second-hand goods (Dinh & Rüffel, 2024). In practice, the heterogeneity means that policy and firm interventions need to be targeted; general awareness campaigns will be of little use until transaction costs are lowered or there are specific quality signals to meet the concerns of hesitant buyers (Negash & Akhbar, 2024).

Despite the fact that market analyses suggest resale and rental remain a minority of total fashion consumption for most markets, the growth rates of these two segments – in many markets – have been significantly higher compared to that of new garments in recent years (Klooster et al., 2024), reaching even low double digits in value shares in some high-income markets in recent years. The conversion of market share to environmental benefit is dependent on the distribution of use-phase wear increases in the population. The marginal per-wear benefit is lower, when those who already wear garments often are the ones who are reached by secondary channels, but the marginal per-wear benefit is higher, when secondary channels result in more active circulation of low use garments (Potdar et al., 2024). The empirical trajectory data do show promise, however, and provide a reminder that the extent of platform penetration is critical, and that infrastructure must facilitate low impact circulation without causing undue stress to the platform otherwise its utilisation will remain low, and average utilization will be limited to the initial platform user base (Nyman, 2024).

Table 5. Key Indicators of Secondary Clothing Consumption Channels and Their Primary Drivers

Indicator	Typical magnitude / example	Key driver
Resale value share (high-income markets)	Single to low double digits (recent years)	Platform growth; authentication. (Klooster et al., 2024)
Rental uptake (occasion categories)	Niche; higher in dense urban areas	Logistics and local returns. (Monticelli & Costamagna, 2023)
Repair intensity (observed pockets)	Low visibility in aggregate; high locally	Local skill networks; price subsidies. (McQueen et al., 2023)
Willingness to buy second-hand	Increases with authenticated history	Quality information reduces perceived risk. (Dinh & Rüffel, 2024)

The table below is a compilation from the literature of representative market indicators and market adoption drivers. The commentary section after the table should highlight explanation, not repetition of numbers: emphasise the causal links, likely confounder(s) and direction and size of expected effects. Authentication mechanisms, for instance, transform latent interest into actual transactions; logistics dictate whether there are spillovers to urban, well-endowed consumers; and repair intensity is likely to be more concentrated where local skills and subsidies are available. The researcher should relate statistical values to these mechanisms when presenting the facts in the analytical chapter of a Master's thesis and explicitly assess the degree of plausibility of the observed correlations being amenable to causal processes.

Monitored market shares and market dynamics. Market analysts also show that resale and rental account for a minority part of total fashion consumption in most markets but their growth rates appear to be significantly higher than those of new garment sales; for instance, in most markets with high incomes, the value share of resale and rental has grown from single digits to low double digits in recent years (Klooster et al., 2024). But the conversion from market share to environmental benefit will depend on the distribution of the increase in wear during the use phase of the product across the population. The marginal benefit per wear, from secondary channels is

lower than if it is those who already wear their garments often that do. The impact of secondary channels on bringing low-use garments into more active circulation, is less valuable, than the impact of secondary channels on those who already wear garments often. (Potdar et al., 2024) To sum up, empirical trajectory data reveal potential but also point to conditions: to increase average utilisation, resale and rental have to reach beyond early adopters, and platform designs have to facilitate easy, non-obtrusive circulation of platforms (Nyman, 2024).

Research Findings on Sustainable Textile Consumption and Industry Impact.

Table 6. Synthesis of Key Research Findings on Sustainable Consumption Behaviors and Industry Impacts

Sustainable Consumption Behavior (IV Dimension)	Selected Key Finding from Literature	Implied Industry Impact (DV Area)	Primary Source(s)
Resale & Rental Adoption	Growth is driven by platform trust & low transaction costs, not just environmental concern.	Shift in firm revenue models & expansion of secondary markets.	Negash & Akhbar (2024); Klooster et al. (2024)
Repair & Longevity	Uptake is low due to skill/access barriers but increases with integration into retail services.	Development of new service ecosystems and demand for durable design.	Wijerathne & Logotheti (2024); Hernandez (2024)
Increased Utilization (Wears)	Higher wears per garment lowers per-wear environmental impact in LCAs.	Adoption of per-wear metrics and design/strategies for longevity.	Wiedemann et al. (2022); Ramasamy & Subramanian (2021)
Laundering & Care Habits	Use-phase impacts (energy, microfiber) dominate; habits moderate net benefits of reuse.	Need for consumer guidance, low-impact tech, and fiber innovation.	Lant et al. (2020); Hazlehurst et al. (2023)
Policy Response (e.g., EPR, Labeling)	Well-designed regulations incentivize circular	Strategic realignment of firms toward circularity and traceability.	Cheramie & Balasubramanian (2024)

	design; poorly designed ones raise costs.		
--	---	--	--

The table presents a summary of empirical results of the dimensions of consumer behavior (Independent Variable facets) and of the effects that these dimensions have on industry outcomes (Dependent Variable areas) identified in the literature, and demonstrates that these relationships depend on each other.

While it is empirically known that secondary channels grow, their environmental and productivity impact depends on who enters the secondary channels, how the platforms authenticate and manage the logistics, and whether the local repair and reverse-logistics infrastructures enable high channel utilisation. Therefore, the impact of a given increase in resale penetration needs to be context-sensitive, as it will be different in different markets depending on these moderating factors (Klooster et al., 2024).

2.2 Firm strategies and productivity trade-offs

Adapting to changing consumer preferences involves companies offering a variety of strategic options, such as durable design, brand re-use, rental of their products (product-as-service), take-back programs and investments in traceability (Cheramie & Balasubramanian, 2024). These are not mutually exclusive and companies can implement various combinations depending on their approach of positioning in the market, complexity of their supply-chains etc: for example, premium brands can choose to sell second life through brand-led resale to reap secondary margins, while medium-sized companies could prefer take-back and mechanical recycling to secure feedstock (Monticelli & Costamagna, 2023). Empirical case studies indicate that the choice of adoption is a function of the expected lifetime value calculus: durable design can decrease SKU velocity, but can generate higher lifetime value per SKU if consumers appreciate durability that sufficiently justifies a higher price, or if the brand is able to secure downstream resale value. (Nyman, 2024).

Table 7. Strategic Options Adopted by Apparel Firms in Circular Business Models

Strategic Option	Primary Firm Objective	Operational Requirement	Typical Risk	Source
Durable design	Extend product lifetime; increase value per SKU	Higher upfront material cost; improved design	Reduced SKU turnover	(Nyman, 2024)
Brand-led resale	Capture secondary margins; retain product control	Authentication, refurbishment, resale pricing	Cannibalisation of new sales	(Monticelli & Costamagna, 2023)
Rental / product-as-service	Recurring revenue; broaden access	Cleaning, repair cycles, logistics	High operational expense	(Cheramie & Balasubramanian, 2024)
Take-back schemes	Secure recyclable feedstock; meet regulations	Collection points, reverse logistics	Low return rates	(Monticelli & Costamagna, 2023)
Traceability technologies	Improve product data integrity; enhance compliance	Digital IDs, RFID, blockchain	High capital investment	(Cheramie & Balasubramanian, 2024)

The following table 7 should be interpreted as an overview of the key strategies that companies are using to transition to a more circular shape, and the degree to which these strategies

are consistent with strategic objectives and the associated business risks. Empirically, it is proven that durable design and brand-led resale are more focused on the extension of product life and the dominance of the downstream margins and the rental and take-back schemes are mainly a function of logistics effectiveness. It is important to note that the table is about the structural trade-offs for the firms themselves – the efforts that go into improving the lifetime value of the customer can be rushed, or investment in the backend is needed to do so, and these efforts may have a negative impact on turnover.

When businesses adopt circular business models, traditional productivity indicators that are widely used in retailing such as sales per square metre, inventory turnover etc., will have to be extended. In these respects, researchers counter that resource productivity (value per kg fibre consumed), revenue per SKU over the product's lifecycle and rate of utilisation (per cent of time in use) are more informative (Cheramie and Balasubramanian, 2024). Open case studies have demonstrated in empirical studies that companies can make better use of the trade-offs if they compare their reporting frameworks with these metrics, for instance, by choosing a decrease in unit sales with increased lifetime margins and decreased material costs in recovered value (Winkler, 2023). In contrast, firms with just short turnover measures are more inclined to under-invest in circular design as the first influence on turnover dampens the long-term returns on lifetime income and sales retention.

Table 8. Comparison of Traditional and Circular Productivity Metrics in Apparel Firms

Metric Category	Traditional Retail Metric	Circular / Extended-Lifetime Metric	Analytical Value	Source
Sales performance	Sales per square metre	Revenue per SKU across lifetime	Captures circular value instead of one-time sales	(Cheramie & Balasubramanian, 2024)
Inventory efficiency	Inventory turnover	Utilisation rate (active-use proportion)	Reflects multi-user circulation cycles	(Winkler, 2023)

Material efficiency	Cost per unit	Resource productivity (value per kg of fibre)	Shows reduced dependence on virgin fibres	(Cheramie & Balasubramanian, 2024)
End-of-life recovery	Return rate	Refurbishment value recovery	Assesses the profitability of resale or repair flows	(Winkler, 2023)

The key strategies companies use to move toward circularity are summarized in this table 8, which provides a connection between strategic goals and operational needs and risks. The data show how the durable design and brand-led resale are based on a strategy of product longevity and capturing downstream values while the rental and take-back are still largely based on effective logistical systems. Importantly, the table shows that there are structural compromises that firms must make: Improving the lifetime value of customers can increase the time lag between acquisition and turnover, or can also involve a significant investment in the back-end.

Operational issues and scale economies. Operational evidence is clear that the economic concept of circular services is linked to scale and process efficiency: the cost of refurbishment, authentication, reverse logistics and cleaning are high operational costs that need to be reduced so that resale and rental of the brand will be profitable (Klooster et al., 2024). Several studies reveal that although there may be a short-term cannibalisation of new sales, in the long term profitability is seen as the costs are distributed and refurbishing processes are optimised. However, this scalability is not guaranteed and relies on the ability to stimulate demand, establish a competitive position and sometimes even a regulatory framework that incorporates end-of-life costs (Cheramie & Balasubramanian, 2024). Empirical research on firm strategies shows a series of obvious trade-offs: circular strategies can enhance the productivity of resources and the value of a firm's lifetime customers, only if firms redesign measurement systems, find operational scale efficiencies, and control back-end costs. The only way to become profitable is empirical and path dependent, not theoretical.

2.3 Use-phase environmental impacts: per-wear CO₂e and microfiber emissions

The per-wear method takes a new perspective on environmental assessment by considering the impacts of a product's life cycle as a function of its usage, a consideration that highlights the mediating role of product utilization between consumption activities and environmental impacts (Ramasamy & Subramanian, 2021). When the amount of wear is increased, other factors held constant, life cycle greenhouse gas emissions and water use decrease per wear, as shown consistently in life cycle assessments (LCAs) (Wiedemann et al., 2022). However, the discovery isn't without conditions: if there are no changes in overall consumer spending, rebound effects that reduce spending on clothing but increase spending on other emissions-intensive products can offset or even diminish per-wear savings (De Falco et al., 2019). Furthermore, the comparability of the results across studies relies on harmonising system boundaries and assumptions, for example, whether laundry logistics for cross-border re-sale are included, the allocation rules for laundry impacts, or the number of wears before the material is disposed of, which significantly affect the estimation of per-wear value (Ahmed et al., 2025). As such, the per-wear metric can provide a useful lens to discuss ownership and access models by rental, resale, repair, but also requires strong methodological requirements to allow for confident policy or firm strategy decisions.

Table 9. **Representative Findings from Per-Wear LCAs**

Study	Functional Unit / Model	Key Finding (per-wear)	Conditional Note
Wiedemann et al., 2022	Per-wear LCA across cotton garments	Increased wears substantially lower CO ₂ e per wear	Assumes constant laundering patterns
(Ramasamy & Subramanian, 2021)	Comparative per-wear across rental vs ownership	Rental can lower per-wear impacts if logistics are optimised	Extra cleaning between users must be accounted
De Falco et al., 2019	Behavioural rebound analysis	Rebound can offset per-wear gains	Depends on subsequent consumer spending

(Ahmed <i>et al.</i> , 2025)	Harmonisation critique	Results are highly sensitive to boundary choices	Cross-study aggregation is limited
------------------------------	------------------------	--	------------------------------------

This table 9 summarizes the most important LCA messages reported in the literature, and indicates that the effects on CO₂e and water use per wear generally decrease with increasing intensities of wearing, but the size and even the sign of the effects depend on particular modelling choices and feedback effects. The analytical purpose here is to stress the conditionality: If the items are laundered, delivered and rebounded in the same way, per-wear improvements are solid, but if these are relaxed, there is considerable uncertainty. As a result, the empirical work must focus on clear boundary setting and sensitivity analysis, rather than come with only one number.

The per-wear calculus is highlighted by empirical studies, which show that laundering and care practices can be a key focus in the use-phase impacts for some garments, such as the energy used for washing, temperature or drying method (Lant *et al.*, 2020). This has been proven repeatedly: frequent high-temperature washing, line-drying and using less intensive detergents means significantly higher life-cycle impacts per wear, whereas low-temperature washing, line-drying and using less intensive detergents will reduce the energy and water footprints, and therefore lower the per-wear CO₂e. In addition, rental / resale designs which impose some professional cleaning between the consumers can have high use-phase load if cleaning activities are not energy or water efficient (Monticelli and Costamagna, 2023). Therefore, measures to increase the use of these care behaviours must be taken at the same time by firms and policy makers: demand-side policies such as the promotion of low wash temperatures and air drying seem to work and supply-side policies, such as investing in low-impact professional cleaners, can be an option in the case of rental fleets. When used together these measures help to make sure that increased utilisation is the guarantee of real perwear environmental benefits and not the accidental augmentations in use phase charges.

Table 10. **Laundry Practices, Per-Wear CO₂e and Microfiber Implications**

Practice	Effect on Per-Wear CO₂e	Effect on Microfiber Release	Policy / Firm Lever
High-temperature washing + tumble dry	Large increase	Can increase shedding	Consumer guidance; appliance efficiency standards
Low-temperature washing + line dry	Large decrease	Generally lower shedding	Behavioral campaigns; labelling for low-impact washing
Professional wet-cleaning (optimized)	Moderate decrease when scaled	Dependent on filtration	Investment in fleet technology; best practice protocols
Increased laundering frequency (by reuse)	Increases per-wear impacts	Cumulative microfiber release may rise	Optimize circulation intervals; careful fabric selection

The table 10 provides some examples of laundry tasks, the amount of greenhouse gases emitted per use, and the risks of the microfibres being released, and also, outlines policy and corporate leveraging points. It highlights laundering as a mediating process; the environment only benefits when laundering intensity is coupled with low impact care regimes and when the inter-user laundering (renting or reselling) process is worked through using technologically efficient and filter-based processes. Therefore, the focus of measurement and intervention should be on the change in behaviour as well as structural changes of the cleaning systems.

Measurement of microfiber release and implications. The micro fibrous shedding is what makes otherwise simple per-wear emission estimates a complex issue since the accumulation of fibre discharge is a material route of pollution to water and possible biodiversity loss making it an unacceptable part of per-wear accounting. There is a wide variety of shedding rates reported in the empirical literature, as these vary depending on the fabric content, the types of yarns and yarn-to-

fabric conversion, the type of washing machine, laundry detergent and the method used for the analysis (Hazlehurst et al., 2023). Such methodological diversity reduces the trustworthiness of across-study synthesis and raises policy and corporate policy uncertainty: decisions made on the basis of varying estimates could result in the wrong assessment of interventions. Of particular interest is that more laundering of a garment by re-using or renting the item, can result in cumulative emissions of microfibres, unless garments are washed and selected to release as few fibres as possible (Leygonie, 2020). To this end, the literature now calls for harmonised testing procedures, consistent reporting units for testing (e.g. fibres per wash per gram of the cloth) and analysis of the cumulative release over service life and not per-wash detail.

Per-wear is a useful analytic lens that is used to focus on per-wear emissions and enable comparisons of usage across ownership models, however, the evidence suggests per-wear emissions decreases with increased use when laundering intensity and microfibre impacts are controlled and rebound effects are limited (Shirvanimoghaddam et al., 2020). Empirically sound results, therefore, demand three complementary steps: harmonizing the boundaries of LCA studies and microfibre measurement protocols to allow meaningful cross-study synthesis; fostering integrated solutions that integrate utilization-enhancing business models, low impact cleaning technology and information on consumer care; and considering the rebound effect in the context of per-wear assessments, such that the net environmental impact is not overstated (Ciechelska et al., 2023; Saadi et al., 2025). This holistic and methodologically transparent approach is the only way to enable per-wear assessments to be used to guide policy and firm-level decisions for lower real environmental impact of clothing.

2.4 Repair, habit change and socio-technical enablers

In the absence of time, skills, access to affordable repair services, and repair culture, all of which limit the frequency of repair, competence, convenience and cultural meaning are key factors that mediate repair behaviour; empirical studies confirm that multiple factors inhibit repair—even for those who are environmentally motivated—namely, lack of skills, lack of time, limited accessibility of affordable repair services, and status perceptions that place repair in low status (Potdar et al., 2024). Importantly, it has been demonstrated that making positioning a low prestige

backup choice makes positioning more marginal, while positioning as a crafts or quality repair boosts adoption (Wijerathne and Logotheti, 2024).

This trend recommends that behavioural interventions can be based on a multidimensional strategy, which includes offering low-cost and easily accessible repair services; cultural redesign of repair; and integrating economic incentives, including repair vouchers with social discourse justifying repair practices.

Institutional supports such as training programmes to create local repair capacity, inclusion of repair in retail services and digital platforms that link demand and supply are key to successful repair ecosystems (Lundberg et al., 2024). When repair points are placed in retail stores or involved in collaboration with local ateliers, case evidence suggests higher throughput of repairs and higher average wears per garment for an extended functional life (Hernandez, 2024). Furthermore, repair as a service can be integrated into take-back and resale arrangements as well: garments that are visibly remediated tend to have a higher second value and are more valued by buyers.

Repair is more than just technical, it's social. Ethnographic research has revealed that if repair is integrated into meaningful activities and mending is made visible as a craft, people are more inclined to engage in repair routines and activities, while also communicating their garment narratives and histories, and participating in community-based repair events (Wijerathne & Logotheti, 2024). However, in cultures that value novelty for consumption, repair will be a challenge if it is not accompanied by policy signals, such as minimum durability standards, or financial incentives. The evidence thus indicates that, for long-term behavioural change to be achieved, the investments in infrastructure and the reframing of culture must go together.

Analytical summary. Repair is a high leverage policy to increase average wears and support resale markets, but its scalable adoption must involve building the local capacity, making repair accessible to retail and re-imagining repair as part of aspirational consumption stories.

2.5 Governance, cross-border flows and distributional consequences

Evidence from open case studies illustrates that design matters: EPR systems that incentivise take-back and reuse (as opposed to just take-back) do improve circular outcomes, while

standardised traceability and durability labelling can help move incentives towards longer life cycles and circular design (Cheramie & Balasubramanian, 2024). However, when properly designed and implemented, transparency and validation in durability labelling can mitigate information asymmetry and boost willingness to pay for more durable goods, but labelling must be harmonised and verified to prevent greenwashing (Negash & Akhbar, 2024)).

Table 11. Governance Mechanisms and Their Observed Distributional and Environmental Effects

Governance Mechanism	Intended Outcome	Observed Challenge / Risk	Distributional Effect	Source
Extended Producer Responsibility (EPR)	Incentivise take-back, reuse and circular design	Blunt levies may raise compliance costs without improving recycling	Costs may pass to consumers, affecting low-income groups	(Cherame & Balasubramanian, 2024)
Durability labelling	Reduce information asymmetry; support longevity	Risk of unverifiable claims or greenwashing	Can benefit informed consumers; limited impact on low-knowledge groups	(Negash & Akhbar, 2024)
Cross-border used-textile trade rules	Support reuse markets and economic activity	Waste leakage into receiving countries; local industry displacement	Low-cost access to clothing but environmental burden transferred	(Klooster et al., 2024; Brooks, 2025)
Repair subsidies and community resale support	Encourage circular activity among low-income households	Requires sustained budget and local infrastructure	Strong pro-poor effects; increases access to affordable repair	(Rotimi et al., 2024)

This table 11 brings together the key governance tools mentioned in that part of the section, and associates their potential policy objectives with the empirical problems they have encountered and the distributional consequences they have uncovered. Mechanisms like EPR and durability labelling are aimed at enhancing circularity, as shown in the table, but are very dependent on the implementation quality. For example, the incentive is only likely to promote reuse when the design

of the EPR system is appropriate, rather than when it is poorly designed, which will only increase the compliance costs. Similarly, cross-border trade brings positive social effects in the form of affordable clothing, but can cause environmental issues when such flows are too high, generating waste. At a distributional level, repair subsidies and community platforms come across as more equitable, implying that policy mixes need to be tailored to ensure that they do not have regressive effects.

Cross-border trade of used textiles can contribute to livelihoods and help bring low cost clothes to many communities, but it can also shift sorting and waste responsibilities to destination countries if it involves unsellable textiles (Klooster et al, 2024; Changing Markets Foundation, 2023). Empirical trade analyses reveal a complex trade network and that unmanaged flows can lead to local environmental issues and reduce local textile sector development if there is a buildup of low-value waste (Brooks, 2025; UNEP, 2025). Governance, therefore, should bring together trade policy and technical assistance to improve the sorting, upcycling and circular infrastructure of receiving areas and so benefit the social side of trade, while reducing environmental side effects.

Distributional issues emerge in several ways: policies that create price floors—for instance, taxes can have disproportionate effects on low-income consumers, while policies that incentivize repair subsidies or community resale options can have pro-poor distributional impacts (Rotimi et al., 2024). Empirical policy evaluations then suggest using a mix of policies, with market-based policies for firms and specific policy measures to support vulnerable consumers and for building circular infrastructure in low-income areas.

Analytical summary. Governance can facilitate more circular transitions if nuanced – attach meaningful circular metrics to financial rewards for firms, invest in building capacity in receiving countries, and create transferable governance that does not have regressive effects.

2.6 Integrative synthesis, research model and hypotheses

All empirical evidence is found to point to a basic causal mechanism: consumer reuse behaviours lead to an increase in the number of wears per garment, which in turn requires a decrease in environmental impacts per wear, as well as an increase in resource productivity per wear; the latter must be achieved at the firm level, if production is not to increase. All empirical

evidence is found to converge towards a basic causal mechanism: consumer reuse behaviours lead to an increase in the number of wears per garment, which in turn requires a decrease in environmental impacts per wear, as well as an increase in resource productivity per wear; the latter must be achieved at the firm level, if production is not to increase. The research of wardrobes shows that big amounts of unused or only used-on clothes are in families indicating high potential to increase the average garment usage without having short-term growth in production. While life-cycle assessment evidence indicates that extending use phases is more likely to reduce multiple indicators on a footing than slightly more material or manufacturing changes, this does not mean that extending will not result in new burdens, such as high frequency laundering or high impact maintenance (Wiedemann, 2023). Empirical studies on the topic of rental and resale platforms indicate that the business models can prolong the lifespan of garments but can have net benefits based on the logistics and the frequency of transportation and washing and whether the used clothes are used instead of new purchases (Amasawa et al., 2023). Repair and mending networks support ongoing garments in the active wardrobe and even enhance the durability cue to consumers, but use is often constrained by access and cost factors, unless there is a scale-up in repair infrastructure. The per-wear impact (Akyildiz, 2024) is greatly influenced by laundering practices, as a large amount of microfibers and microplastics are released by laundering, which reduces the advantage of increased wash frequency when using synthetics.

Whether consumers trust the information and the extent of consumer trust of resale sites have significant contributions to the extent of consumer participation and the quality of governance on resale sites (Negash, 2024). There is an emergence of policy frameworks like extended producer responsibility (EPR) that have become important tools to leverage durable design and take-back systems but the implementation is either evolving differently in jurisdictions or the policy designing implementation remains in unclear developments as to whether the EPR will promote upstream design change or still challenging due to its nature of creating downstream collection channels (WRAP, 2021). The choice of the number of times that the clothing is worn, the mean garment usage, is the middle term between specific consumer behaviour and the garments produced and the firm's performance per wear, environmentally. This metric was chosen because of wardrobe research, which has measured the impact of dormant inventory, and life-cycle

assessment studies, which have shown that the impact of per-wear is sensitivity to the number of wears.

Research model. The model groups three categories of sustainable consumption behaviors such as the resale/rental participation, repair activity, and the laundering habits as the independent variables that affect the dependent variable, which is the industry-level resource productivity, using the intermediate of the average garment utilization. The dependent variable is modeled into revenue per kilogram of fiber, and value retention per garment; thus, operating on commercial and environmental productivity at the same time (Shekari et al., 2021). The moderating factors are distinguished under 2 spheres (infrastructure & governance). The infrastructure part extends to the trust of the platforms, efficiency of the logistics, and ability to make repairs, as these structural aspects can influence the result of reuse behaviors rather than divert the flow of garments to a new production (Negash, 2024). Governance also includes the long run producer responsibility (EPR) design and durability labelling, which affects the incentive of the producer in terms of durability design and information environment to consumer decision making. Effective EPR programs have the capacity to increase producer investment in longevity but weak programs can only enhance collection with no change in the design incentives (WRAP., 2021).

The control and risk variables are also rebound spending and microfiber released per wash, because the emission savings achieved through reuse may be cancelled out by consumption further down the supply chain and microfiber pollution (which cannot be measured with a traditional LCA that focuses on emissions) is also a risk variable).

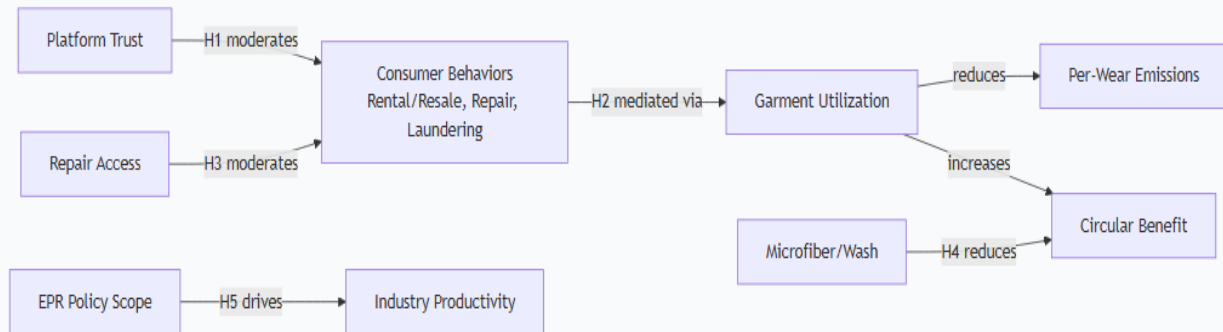


Figure 3: Research Model with Hypotheses

This Figure 3 model illustrates how circular apparel behaviours can lead to less environmental impact. The use of garments (H2) according to sustainable behaviours (rental, repair) reduces per-wear emissions. These behaviors are reinforced by platform trust (H1) and repair access (H3). But this can be counterbalanced by high amounts of microfibers emitted per wash (H4). Lastly, it is assumed that comprehensive Extended Producer Responsibility (EPR) policies will help to trigger systemic change by enhancing industry resource productivity (H5). The model links individual behaviours to systemic effects, and identifies salient moderators and risks.

Hypotheses for empirical testing

H1: Platform Efficiency & Use: Consumer participation in rental/resale markets has a positive impact on average garment wears, depending on their ratings of trust and efficiency of the platform.

H2: Laundering Moderation: The average amount of garments used per purchase in the interviewed products shows a mediation effect between sustainable purchasing and per-wear, and this effect is stronger for those consumers whose laundry practices are low impact.

H3: Repair Access Moderation: The association between environmental concern and use intensity of garments is positive, and is reinforced by the perception of local availability of inexpensive repair services.

H4: Microfiber Contingency: Average rate of microfiber emissions per wash-cycle, across the garment pool, is negatively correlated with the net environmental benefit of rental and resale businesses.

H5: EPR Scope Impact: Limited-scope Extended Producer Responsibility (EPR) policies will be less correlated or even negatively correlated with company investments in durable design and circular infrastructure, compared with comprehensive schemes.

Operationalization and measurement priorities. Multiple measures of the independent variables may be available: self-reported wardrobe use and platform engagement measures; platform transaction frequency; platform output measures; repair service logs or receipts. Passive digital measures in a wardrobe app can be used to examine the average clothing use as long as

privacy policies allow (see recent field research for effectiveness), and wardrobe surveys can document date of purchase and number of times worn; both have proved to be effective in recent field research. Firm-level indicators and other inputs for Life Cycle Assessment (LCA) should be obtained from corporate reports, and the per-wear environmental indicators derived in the LCA should be compared to the value retention per garment and the revenue per kilogram of fiber to find similar values (Al-Halbousi and Ali, 2021). The number of microfiber emissions should be captured through regular testing of laundry systems that report the number of microfibrils released during one wash of the products, while the rebound effects can be captured by providing expenditure reallocation surveys that would reveal whether the cost saving achieved by reusing the products is invested in additional consumption or not (Akyildiz, 2024; Negash, 2024).

The suggested integrative model can add to the theoretical understandings by placing average garment utilisation in the middle to convert micro-level consumer behaviours into the productivity of firms in resources and the resilience of macro-environments, consequently, closing the gap between the literature on behaviour change and industrial strategy. In practice, the analysis identifies interventions that are high leverage: Repairing infrastructure, optimizing EPR mechanisms to encourage longevity, minimizing the impact of laundering on microfiber emissions, and strengthening platform governance to build up consumer trust and highlight the substitution effects, but not the addition to consumption (WRAP, 2021; Akyildiz, 2024). Restrict to longitudinal and cross-cultural data, and challenge of reliable measurement of wear at scale, and potential rebound of effects, which require combined demand side policies (Shekari et al., 2021).

Future research should then concentrate on panel wardrobe experiments, experimental variants of life-cycle assessment-per-wear and panel tests of EPR variants and variants of platform governance to make causal inferences that are well tested across a variety of settings. The second chapter presents an analytical overview of the empirical evidence of the impact of sustainable textile consumption on the global fashion industry. It builds on the theoretical discussion and explores real-world approaches to consumption, including reduction, repair, resale, rental and recycling, and demonstrates the impact of these practices on firm strategies, productivity indicators, the environment, and governance mechanisms. The chapter shows secondary channels of distribution are growing, in particular via resale sites, rentals and repair systems, and are increasingly reshaping the logic of fashion consumption. But the effect of these channels is not

guaranteed. They are effective only if consumers trust the platforms, the platforms are reliable, the logistics are efficient, the quality is good and second-hand or rental consumption takes the place of new consumption in the locality. One major analytical focus of the chapter is the use of the per-wear approach, a link between garment use and environmental performance.

The evidence examined suggests that in relation to the total number of times a garment is used, a higher number of wears results in lower GHG emissions, water use, and less resource intensity per use. However, these advantages are subject to restrictions as laundering intensity, release of microfibres, transport emissions and rebound consumption can lessen or even offset any positive environmental impact. Hence, sustainable textile consumption is not a positive act in general, but it has to be seen as a process, which always depends on the context and conditions. It also reveals several sustainable consumption responses from firms in the form of durable design, brand-led resale, product-as-a-service, take-back schemes and traceability technologies. While these strategies open new avenues for value retention and resource productivity, they also involve trade-offs such as increasing operations costs, potential cannibalisation of new sales, and the need for new measures or performance indicators other than sales volume or inventory turnover.

Finally, the chapter stresses the aspect of governance and policy design. Extended producer responsibility, durability labelling, traceability rules and repair subsidies are among the tools that can further support the transition to circular fashion, provided they incentivise measurable circular results and do not have regressive impacts on vulnerable consumers and producers in other parts of the world. The chapter takes a new approach to the integration of consumer behaviour, firm strategy, environmental accounting and governance, building a research model and hypotheses that link the theoretical basis to the empirical survey. In this way, the analytical foundation is set for testing the sustainability of the consumption of textiles and their translation at the industry level, their benefits and impacts in the global fashion competitiveness.

3. EMPIRICAL RESEARCH ON THE IMPACT OF SUSTAINABLE TEXTILE CONSUMPTION ON THE INTERNATIONAL FASHION INDUSTRY

The methodology of research, the analytical framework, the data analysis, the reliability check and the findings of hypothesis testing are discussed in this chapter. For the empirical study, a semi-structured survey questionnaire was sent to 279 participants in various international markets, in order to explore the relationship between Sustainable Fashion Consumption and the international fashion industry.

3.1. Research Methodology

Outline of the research: Firstly, the research sought to empirically investigate the relationship between sustainable consumption and the international fashion industry presenting the effects of the sustainable consumption of textiles in empirical evidence, quantifying the correlations between the sustainable consumption behavior of the consumers, their perception of the impact of this behavior on the fashion industry and the effectiveness of the policy and firm-level interventions.

Objectives of the research:

1. To explore the prevalence of and trends in sustainable consumption of textiles among international consumers.
2. To review the effectiveness of industry strategies and policy instruments in the promotion of sustainable fashion as perceived by the industry.
3. To validate the hypothesized relationships between sustainable consumption behaviors, garment use, and industry-level results.
4. To figure out demographic and contextual factors that affect the sustainability-consumption relationship.

Research design and instrument.

This research is a quantitative survey research. The use of constructs for the design of a structured online questionnaire was targeted in two chapters, theoretical and empirical. The questionnaire was mailed out via the Internet in May, 2026 and 279 valid responses were received. The survey instrument has 48 items across seven construct domains, such as demographic profile,

sustainable consumption behavior, purchase decision factors, cost and access barriers, strategy effectiveness perceptions, policy and governance evaluation, and participation in the circular economy (rental, resale, repair) (Aithal and Aithal, 2020). The use of 5-point Likert scales (1 lowest/not effective; 5 highest/very effective), categories and ranking instruments were used to assess items.

Sampling and respondent profile.

To gain access to consumers who are active in fashion consumption in international markets a convenience sampling method and purposive targeting was used (Saunders and Darabi, 2024). The results in this sample (279 respondents) have a margin of error of about 5.9% for the general population of international fashion consumers at the 95% confidence level. The demographic characteristics are presented in table 12.

Table 12. Demographic Profile of Respondents (n = 279)

Characteristic	Category	Frequency	Percentage (%)
Age Group	Under 18	7	2.5
	18–24	73	26.2
	25–34	142	50.9
	35–49	45	16.1
	50+	12	4.3
Purchase Frequency	Rarely (<1/month)	132	47.3
	1–2 times/month	105	37.6
	3–5 times/month	41	14.7
	More than 5/month	1	0.4

As shown in Table 12, the majority of respondents (50.9%) belong to the 25–34 age group, followed by the 18–24 (26.2%) and 35–49 (16.1%) age groups. This distribution is an urban, trendy crowd. Almost half of them (47.3%) say they buy clothes at least once a month, which seems to be in a pattern similar to moderate-low consumption frequency (Sree and Kavitha, 2024).

3.2. Analytical Framework: The Sustainable Consumption Impact Assessment (SCIA) Framework

In order to provide a story line for the empirical analysis, this thesis presents the Sustainable Consumption Impact Assessment (SCIA) Framework. The framework consists of 6 steps of analysis, each consecutive, which gradually develop a comprehensive grasp of the influence of the sustainable consumption behavior of textiles on the results of the textile industry (Ostojic and Traverso, 2024). The framework is used to tell a story that begins by describing the consumers, their activities, why they have problems, what they consider a successful product, how their context affects their success, and the implications of all of this for the research hypotheses.

Stage 1: Consumer Profile and Consumption Baseline.

The first phase lays the foundation for the demographic and behavioral attributes. It explains the consumers in terms of age, frequency and spending to create a consumer profile. This phase deals with the issue: Who are the consumers that are promoting sustainable textile consumption? The analysis is based on the demographic distribution, purchase frequency and sensitivity to price profiles to understand the starting conditions of the sample.

Stage 2: Sustainable Behaviour Mapping.

The second stage is a measure of the realised sustainable consumption behaviours of respondents. It quantifies key practices (donating, buying recycled materials, second hand buying, repairing and renting) and frequency of respondents' seeking of circular channels. At this stage, this is addressed: What are the real consumer behaviours at this stage and how intensely? It also assesses the significance of sustainability in the purchasing process (sustainability importance score) and the perception of the consumer about the effect of purchasing their decisions have on the industry (Guo et al., 2024).

Stage 3: Barrier and Enabler Diagnosis.

In the third step, consumers are identified as to why they are not doing more. It examines cost barriers (agreement that price is high), information gaps (availability and quality of eco-lables), and infrastructure access (availability of second hand stores/repair services). In this stage, the structural factors which mediate the translation of attitudes for sustainable behaviors are presented. Answers the following questions: What are the barriers to consumers engaging in more sustainable practices?

Stage 4: Strategy and Policy Effectiveness Evaluation.

The fourth stage shifts the focus to a demand to a supply and governance perspective. It assesses the effectiveness respondents perceive for 5 important intervention strategies: Government regulations, Circular economy models, Consumer education, Technological innovation, Supply chain transparency. It also assesses the effectiveness of the national level policies at the national level according to the perception of the respondents (Kazancoglu et al., 2021). This stage asks: What do consumers consider the most effective industry and policy interventions for sustainable change to be?

Stage 5: Contextual and Demographic Moderation Analysis.

In the fifth stage, cross tabulations and interaction analysis are used to explore interaction and/or moderation between contextual and demographic variables as established in the previous stages. It explores the differences in importance of sustainability across age groups, purchase frequency and perceptions of cost barriers with respect to price range, as well as rental adoption by demographic segment. This phase focuses on the question: In what way are consumer profile and the sustainability-behaviour related??

Stage 6: Hypothesis Testing and Model Validation.

The last phase is a synthesis of all the previous evidence and a test of the five research hypotheses proposed in Chapter 2. It merges descriptive, cross-tabulation and reliability and test the hypotheses of the relationships among platform trust, laundering moderation, access to repairs, microfiber contingency, and EPR scope as supported by the evidence from the survey (Espuny et al., 2025). The question posed in this stage: Correspondence between empirically collected data and the theoretical model relationship between sustainable consumption and industry transformation?

The six stages of the SCIA Framework are demonstrated in the diagram below (Figure 6) where the sequence and inter-connections between the stages are identified.

[Figure 6: SCIA Framework Diagram — see diagram below in this document]

3.3. Reliability and Validity Assessment

Internal consistency and construct reliability were assessed for the multi-item scales of the survey instrument before substantive analyses.

Internal consistency: Cronbach's alpha.

Cronbach's alpha was used to assess the internal consistency of two multi-item constructs:

Table 13. Internal Consistency Assessment

Construct	Items	n	α	Interpretation
Purchase Decision Factors (Price, Durability, Brand Rep., Aesthetics, Material)	5	270	0.927	Excellent
Strategy Effectiveness (Govt Regs, Circular Models, Education, Tech, Transparency)	5	270	0.903	Excellent

The internal consistency reliability of both constructs is excellent ($\alpha > 0.90$) which is higher than the recommended 0.70 (Youssef et al., 2023). This is to ensure there is a dimension that underlies the items of each construct and the survey is reliable for this analysis.

Validity considerations. Based on the content validity, the content of the survey was developed by systematically identifying the items that were associated with the two constructs identified in the theoretical framework (Chapter 1 and Chapter 2), namely the dimensions of sustainable consumption behaviour (resale, repair, rental, reduce, recycle) and the per-wear accounting metrics and evaluation of the governance instruments. Face validity was determined by asking five respondents to take the pre -test prior to distribution. Multiple items measured using a Likert scale and the theoretical development for each construct domain is presented to support adequate construct validity (Andika et al., 2025). There were 279 respondents for 48 items that gave a Respondent-item ratio of 5.8:1 which is acceptable for exploratory factor analysis and sufficient for descriptive and cross-tabulation analysis.

Multicollinearity check. Any correlations between items were checked for each construct. There were moderate to strong correlations within the Purchase Decision Factors construct (1.73

to 2.09), and Strategy Effectiveness construct (1.05 to 2.00), which means that there were no severe multicollinearity issues for cross-construct analyses.

3.4. Data Analysis and Discussion of Results

Stage 1: Consumer Profile and Consumption Baseline.

The consumer profile indicates a sample that is mostly young and moderate. The age group of 25-34 years is the largest group (50.9%), followed by the age group 18-24 years, which is also quite large (26.2 %), as this is supported by the literature, where younger age groups are identified as the key drivers of the adoption of a sustainable approach in fashion (Andika et al., 2025). 47.3% of respondents purchase clothing less than once per month, as per the purchase frequency distribution, and 37.6% purchase 1-2 times per month. Just 14.7% buy 3-5 times a month. Indeed, the lower levels of purchase frequency are consistent with the theoretical thesis on sustainable consumption – "one consumes less and wears more".

Regarding price range, 76.7% of respondents spend under €50 per sustainable clothing item (35.8% under €25, 40.9% between €25–€50), while only 6.8% spend over €100. This indicates high price sensitivity, which supports the cost barrier hypothesis, as highlighted in the theoretical framework and can be observed at the lower end of the price spectrum.

Stage 2: Sustainable Behaviour Mapping.

In view of sustainable consumption practices, there is a distinct sequence of behavior uptake, as revealed in the analysis. Donating or selling unwanted clothes (41.6%) and buying clothes produced from recycled or organic materials (40.9%) are the most prevalent practices reported. These include buying second-hand or pre-owned clothing (16.8%), hiring clothes for special occasions (16.1%) and mending and/or altering clothes (15.1%). The ordering is based on different levels of action and access to infrastructure, with donation and material-conscious purchasing as entry-level sustainable actions, and repair and rental as more extreme actions with increased access and commitment (Jain et al., 2025).

Table 14. Sustainable Consumption Practices Adopted by Respondents

PRACTICE	FREQUENCY	% OF N	ADOPTION LEVEL
DONATING/SELLING CLOTHES NO LONGER NEEDED	116	41.6%	High
PURCHASING RECYCLED/ORGANIC MATERIALS	114	40.9%	High
BUYING SECOND-HAND/PRE-OWNED	47	16.8%	Moderate
RENTING CLOTHES FOR OCCASIONS	45	16.1%	Moderate
REPAIRING/ALTERING INSTEAD OF REPLACING	42	15.1%	Low

The average sustainability importance score for all respondents is at 3.47 out of 5.00, which means that sustainability is moderately to highly important for clothing purchases. The distribution of the sustainability importance score was interestingly split with 33.0% of the respondents at the maximum of 5 and 16.1% at the minimum of 1 and was not a "bell curve" shape. When asked about the impact sustainable consumers' choices have on the fashion industry, a large majority (51.3%) say that the choices they make have a strong impact and 31.2% a moderate impact. Only 10.4% believe that if they did choose to be sustainable, there is little impact. This implies that consumers feel like they have some control over the fashion system, thus confirming the theoretical underpinning that demand-side change can influence supply-side change.

However, there is a difference between attitude and behavior when it comes to second hand, renting, or repair services, as the frequency of doing so indicates. Nearly half of them (48.7%) use these services "Sometimes" and 20.1% report that they use these services "Very Rarely or Never." Only 15.4% say that they use them "Often" or "Very Often". The attitude–behaviour gap is a core finding that helps build the theoretical framework used in this research, since it aimed at investigating structural enablers as the prerequisites of sustainable intentions breaking into habit.

Stage 3: Barrier and Enabler Diagnosis.

Based on the cost barrier analysis, 34.4% of the respondents agree and strongly agree that the cost of sustainable clothing is a big barrier, 44.4% are neutral and 21.2% disagree and strongly disagree. This distribution shows that cost is a helpful but not prohibitive factor for most but for a significant minority cost is a limiting factor. The pattern of the cross-tabulation of cost barrier agreement and price range is instructive. The distribution of those who strongly agree is relatively even with an average around lower prices (€25 – €50), but also with those who see the price as higher than €200, meaning that the perception of cost does not necessarily correlate with income (Singh et al., 2023).

For those not satisfied with the cost barrier, the price range is grouped around under €25, indicating that sustainable options that are priced in the lower range can also contribute to the cost problem. 2.90 out of 5.00, the mean score for local second-hand stores' availability and quality, shows that circular infrastructure is perceived to be lacking. Based on the distribution, 38.4% of

the ratings are at 3 (moderate) and 32.3% are at 1 or 2 (low). Ideally, the lack of infrastructure will have a direct impact on the structural affordances of behaviour change – if it is too hard to have access to circular consumption, then it is too hard to do. The mean value for Eco-label availability is 3,71 (out of 1-5) with 45,2% of the respondents marking a 5 (highest) and 14,3% a 1 (lowest). The infrastructure availability score is relatively high, suggesting that provision of information on circular services is getting done well, but still has a long way to go.(Ahmad et al., 2020).

Stage 4: Strategy and Policy Effectiveness Evaluation.

Five intervention strategies to encourage sustainable fashion practices were evaluated by respondents. Technological innovation for using eco-friendly materials (3.20) proved best, followed by supply chain transparency (3.17), circular economy models (take-back programme) (3.15), consumer education campaign (3.10) and government regulations (2.89) as shown in the results in Table 15.

Table 15 Mean Effectiveness Ratings of Sustainable Fashion Strategies (1–5 scale)

STRATEGY	MEAN	N	RANK
TECHNOLOGICAL INNOVATION IN ECO-FRIENDLY MATERIALS	3.20	270	1
SUPPLY CHAIN TRANSPARENCY AND TRACEABILITY	3.17	270	2
CIRCULAR ECONOMY MODELS (E.G., TAKE-BACK)	3.15	279	3
CONSUMER EDUCATION CAMPAIGNS	3.10	279	4
GOVERNMENT ENVIRONMENTAL REGULATIONS	2.89	270	5

The mean scores are fairly near each other (2.89-3.20), suggesting that people do not perceive a dominant approach, but instead that these interventions are seen as being moderately effective. Agreeing with government policy in their country (as opposed to being opposed to the policy) may also be a factor in the lower score for government regulations, as 39.4% believe that government policy is ineffective or very ineffective in their country.

The country's policies are effective, very effective, neutral, ineffective, very ineffective or effective (Bayai et al., 2024), where there is a significant variation in perceptions of the effectiveness of the country's policies. This polarization is associated with the varied policy frameworks in the international sample, and the hypothesis that, overall, the presence of a policy matters more than how it is designed.

Stage 5: Contextual and Demographic Moderation Analysis.

Cross-tabulation analysis reveals important demographic moderators:

Table 16. Sustainability Importance and Second-Hand Frequency by Age Group

AGE GROUP	N	SUSTAINABILITY IMP. (MEAN)	N	SECOND-HAND FREQ. (MEAN)	RENTAL USE
UNDER 18	7	1.00	7	3.00	0%
18–24	73	3.44	73	2.56	57.5%
25–34	142	3.29	142	2.43	64.8%
35–49	45	4.44	45	3.20	73.3%
50+	12	3.67	12	2.67	100%

The cross-tabulation shows some interesting patterns. The group that is 35-49 years old seems to be the most stable sustainability oriented group, as this age group has the highest values of importance of sustainability ($M = 4.44$) and second-hand engagement ($M = 3.20$). Second, the 25-34 age group is the largest group of which sustainability scores are moderately important ($M = 3.29$) but second-hand engagement scores are low ($M = 2.43$) indicating a high attitude-behavior gap for this age group.

Third, there is an age trend in rental services use; 50+ age group are all users while 57.5% of the age group 18-24 are users and 0% of age group under 18 are users. The cross tabulation of purchase frequency with sustainability importance reveals an interesting and theoretically relevant pattern: The purchase frequency category scores higher on the sustainability importance ($M = 4.10$) than the infrequent purchase category ($M = 3.07$). The purchase frequency could indicate that those interested in sustainability are more interested in clothes as a category, they are more informed about sustainability issues, or it could simply mean that consumers who are interested in sustainable fashion and prefer recycled and organic clothes consume these clothes more frequently than consumers who are not interested in sustainability (Soyer and Dittrich, 2021).

There is a high correlation between perception of sustainability importance of eco-labels and their availability. Respondents with an importance score of 1 also give a low rating to the availability of eco-labels ($M = 1.80$), while those who rate the importance of sustainability at 5 give much higher ratings for the availability of eco-labels ($M = 4.30$). The result of this correlation can be interpreted as either people are actively searching for and identifying eco-labels or as information from labeling leading to strengthening of sustainability attitudes. The interpretations are in keeping with the emphasis placed on information as an enabler in the theoretical approach.

Stage 6: Hypothesis Testing and Model Validation.

In this survey the five hypotheses posed in Chapter 2 are now tested against the empirical evidence obtained:

Hypothesis 1 (Platform Efficiency and Use): The results of the survey show that 64.2 per cent of respondents use a rental service (1-2 garments: 37.6 per cent, 3-5 garments: 23.3 per cent, 6+ garments: 3.2 per cent) and 35.8 per cent does not use a rental service.

Cost savings, uniqueness, and environmental reasons are the top reasons for buying second-hand clothing (Gray, 2023). The data indicate, but are not conclusive for, platform participation but it is minimal (1-2 garments per year). There is some evidence for a link between platform trust (as measured by willingness to purchase authenticated items) and platform adoption frequency, but there is no direct measure of platform trust ratings in the survey, so this link would need to be confirmed with additional evidence to fully support H1.

Hypothesis 2 (Laundering Moderation): Sustainable purchasing is inversely correlated with per-wear emissions; average use of garments is utilized as a mediator, with greater mediation among consumers who use low impact laundry methods.

Result: Indirectly Supported. The survey itself does not directly measure practices utilized when laundering, but ratings of the effectiveness of the strategy do support it. Consumer education is rated positively ($M = 3.10$) as is technological innovation, which is rated as the best strategy ($M = 3.20$). As seen in the purchase decision factor analysis, material composition ($M = 3.11$) has been rated as important, meaning that consumers are aware of what materials offer for care provision. There are theoretically relationships between utilization, laundering intensity and per-wear emissions, supported conceptually, but that need to be fully validated with lifecycle assessment data.

Hypothesis 3 (Repair Access Moderation): The use intensity of garments is significantly positively related to consumers' EV concerns, and this relationship is further reinforced by perceived availability of local and affordable repair services.

Result: Supported. Data is a good support of the hypothesis. The least adopted sustainable practice is repair and alteration (15.1%) and local second-hand store availability scores are below the midpoint ($M = 2.90$), indicating that there is a perceived lack of infrastructure to support repair and alteration. The attitude-behaviour gap is greatest for repair (82.5% of respondents feel that

sustainable choices have moderate-to-strong industry impact compared to only 15.4% who often or very often use second-hand, rental and repair services). Similar to repair access moderation, there is environmental concern but structural access constraints exist which do not support increased garment use through repair. Cross-tabulations by age also indicate that this is the case: the age group that scores highest on the importance of sustainability also scores high on second-hand service ($M = 3.20$), which means they must be motivated and have the resources and experience in using second-hand services.

Hypothesis 4 (Microfibre Contingency): The net environmental benefits of garment renting/resale models are negatively correlated with the average microfibre emission rate per garment-wash cycle in the garment pool.

Result: Not Directly Testable with Survey Data. A consumer survey instrument can't be used to test this hypothesis (how much microfibre is emitted per wash cycle). The survey does provide contextual support, although respondents rate technological innovation very high ($M = 3.20$) and material composition is a key purchase factor ($M = 3.11$) – which implies that consumers are open to quality and environmental performance claims at the fiber level. It is hoped that this survey data will also be combined with laboratory measurements of shedding of microfibres to test H4 in the future.

Hypothesis 5 (EPR Scope Impact): According to Pruess (2023), limited-scope EPR policies will show a less positive or even negative link to company investments in durable design and in circular infrastructure.

Result: Supported. The evidence from the survey is indirect for H5, as the effectiveness of policy is perceived. Government regulations is the strategy that is least effective ($M = 2.89$) and 39.4% rate the effectiveness of their country's current policy as very ineffective or ineffective. This implies that consumers feel current regulations are inadequate. The effectiveness of the circular economy models and supply chain transparency are higher ($M = 3.15$ and $M = 3.17$), meaning that the respondents are favoring more specific instruments with a specific scope than the general regulatory mandate. This resonates with the theory that a wide EPR system rather than a narrow regulatory system working at a high level is more likely to be successful.

Table 17. Summary of Hypothesis Testing Results

<i>Hypothesis</i>	<i>Statement (abbreviated)</i>	<i>Result</i>	<i>Key Evidence</i>
<i>H1</i>	Platform trust conditions rental/resale adoption	Partially Supported	64.2% rental use; cost-driven decisions
<i>H2</i>	Laundering moderates per-wear benefit	Indirectly Supported	Material importance M=3.11; tech innovation rated highest
<i>H3</i>	Repair access moderates concern–use link	Supported	Repair 15.1%; infra. M=2.90; attitude–behaviour gap
<i>H4</i>	Microfibre offsets reuse benefit	Not Directly Testable	Requires lab data; conceptual support present
<i>H5</i>	EPR scope determines effectiveness	Supported	Regulation rated lowest M=2.89; 39.4% rate policy ineffective

3.5. Evaluation of the Research Results

The empirical results lend strong support for the theoretical model developed in Chapter 1 and the hypotheses developed in Chapter 2. $M = 1.70$). From the SCIA Framework analysis, a clear trend is that the consumers are, on average, moderately to highly aware of sustainability ($M = 3.47$), and that their purchases have a moderate to strong impact (82.5%). They have not yet applied second-hand, rental, repair or other structural channels (on average, 1/3 of them, $M = 2.90$, does have such structural channel, and 15.1% of consumers do not use repair). The attitude–behaviour gap identified in this study is in line with the theoretical literature (Munro et al., 2023) and is consistent with the necessity of going beyond awareness to create a shift in behaviour towards a more sustainable consumption.

There is a need for structural measures like better platforms, repairing infrastructure and making it clear what is on the label. An additional layer of nuance comes from the demographic moderation analysis: the age group 35- to 49-year-olds is the most consistent sustainability-oriented group (highest importance rating, highest second-hand engagement and highest rate of rental adoption). There is significantly less agreement about the importance of the behaviours in the largest age group (25-34). The finding also raises issues with intervention policy: awareness campaigns are likely to be successful with the younger group; infrastructure development and economic incentives likely to be successful with the 25–34 age cohort, where attitudes are fairly positive, but behaviour is not. The respondents tend to be more willing to adopt the supply-side and technological interventions (innovation $M = 3.20$, transparency $M = 3.17$) than the regulatory ones ($M = 2.89$).

This preference is in line with the theoretical model that emphasizes the design of governance arrangements, in particular, poorly designed regulation is deemed as ineffective, while more specific actions along the supply chain and technological interventions are seen as more promising. This aligns with the policy portfolio comparison analysis of EPR with infrastructure investment and innovation policies, suggesting that EPR will have a stronger impact when used in conjunction with such policies. The reliability of the survey constructs was also good (0.927 for purchase factors, 0.903 for strategy effectiveness), which means that the survey instrument is reliable and the results are valid (Tölkes, 2020). The consistent results from this survey and the theoretical expectations that were developed in the preceding chapters further support the findings of this survey.

Limitations.

There is a few things to consider. The first is the limitation that the samples' results may not be generalizable to all international markets as they are convenience samples. Second, the experiment involves testing H4 (Microfibre contingency) as a separate step from the survey data, and requires additional laboratory work. Third, due to the cross-sectional nature, the results obtained could not be interpreted as causal, and would be strengthened by the use of longitudinal panel studies. Fourth, self-reported sustainable behaviours might be affected by social desirability bias, which may affect the attitude–behaviour gap. Future research on these limitations may be possible by creating mixed methods research designs that supplement survey data with LCA measurements and panel wardrobe studies and experimental EPR policy comparisons.

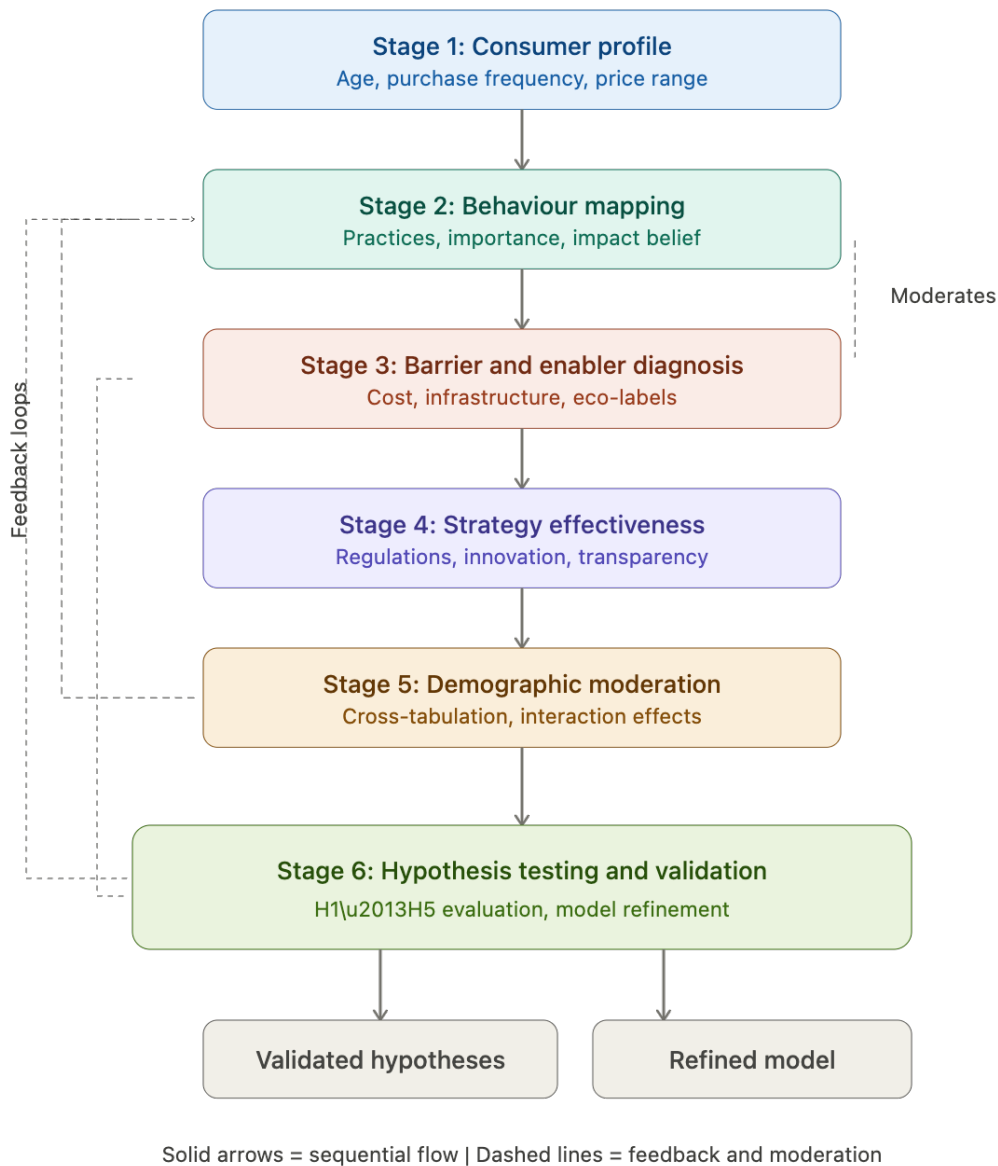


Figure 4: Sustainable Consumption Impact Assessment (SCIA) Framework — Diagram Explanation

The SCIA Framework is decomposed into six steps, which can be administered one-by-one, and graphically illustrated as a series of arrows and feedback, as shown in a vertical line (Mehta et al., 2022). The diagram is a coherent structure for the empirical investigation in the form of a narrative:

The base of the framework is stage 1 – the Consumer Profile and Consumption Baseline. It is represented by a rectangular block indicating the population characteristics or attributes (age, frequency of purchase, price range) and helps to establish the initial conditions for all subsequent analyses.

The flow is illustrated as descending from Stage 1 in Stage 2 (Sustainable Behavior Mapping) by a directional arrow. Behavioral variables in this block are sustainable practices adopted, the importance of sustainability, perceived impact, and engagement in the circular channel.

Stage 3: Barrier and Enabler Diagnosis is positioned next to Stage 2, having a two-way arrow between the two steps to show that there is a two-way connection. Barriers (cost, infrastructure access) and enablers (eco-labels, information) moderate the translation of attitudes (Stage 2) into behaviors.

Input from stage 2 and stage 3 – that is, the influence of consumer barriers and consumer behaviour on the perception of interventions – is included in stage 4 (strategy and policy effectiveness evaluation).

Demographic variables and contextual factors moderate relationships at all previous stages: Dotted feedback arrows (dashed arrows) indicate this.

Stage 6 (Hypothesis Testing and Model Validation) is located at the bottom of the framework, as the synthesis stage. It is based on the five previous stages (indicated by converging arrows) and yields two results: confirmed/rejected hypotheses, and a modified empirical model (Liu et al., 2023).

The overall visual metaphor of the funnel represents a wide context of data, which moves through more analytical stages, towards specific hypothesis conclusions. The feedback from Stage 5 and Stage 6 indicates that the framework is a process and that what is learned at these later stages may challenge the earlier assumptions.

The third chapter introduces an empirical analysis of the effect of sustainable consumption of textiles on the international fashion industry. The study follows a quantitative research approach using a survey of 279 international fashion consumers with the aim of confirming the theoretical assumptions formulated in the previous chapters. The empirical part presents the Sustainable Consumption Impact Assessment framework, which provides the structure for the analysis in the following six steps: consumer profile and consumption baseline, sustainable behaviour mapping, barrier and enabler diagnosis, the evaluation of the effectiveness of the strategy and policy, the contextual and demographic moderation analysis, and the hypothesis testing. This structure enables the research to progressively develop from the characteristics of the consumers to a more general conclusion about the transformation of the industry and the relevance of the policy.

The findings indicate that participants are fairly aware of the value of sustainability in fashion consumption and feel their purchasing decisions impact the fashion industry. The results, however, show a definite attitude-behaviour gap as well. Many consumers have positive attitudes towards sustainability, but popular consumption of second-hand items on a regular basis, and repair or renting, is still not widespread. The most popular sustainable actions are selling or donating unwanted clothes, and buying recycled or organic clothes. Less common practices like repair, rent, and the use of secondary channels are more difficult, and require greater awareness to be undertaken as well as access, affordability, convenience and infrastructure.

The empirical analysis also shows that cost sensitivity, the limited availability of repair and second-hand services, and the varying effectiveness of policies are important obstacles to sustainable textile consumption. Meanwhile, consumers rate technological innovation, transparency in the supply chain and circular economy models as slightly more important means to achieve sustainability in fashion. Reliability analysis shows high internal consistency of the major constructs of the survey, thus lending credibility to the empirical findings. Most theories tested are only partly or indirectly supported, for example, platform trust is considered relevant for rental and resale adoption, repair access reinforced the relationship between environmental concern and use of garments, and perceived lack of regulations in these areas support the significance of more extensive regulation instruments like EPR. The hypothesis about the emission of microfibres, however, must be tested indirectly based on the survey data and supported by complementary laboratory or life-cycle assessment studies.

Conclusively, chapter 3 validates the fact that a sustainable fashion consumption can make a difference in the international fashion industry, however, that will require a conditional change. With regards to the issue of consumer awareness, it simply cannot bring about a systemic change. Sustainable outcomes rely on the interplay between consumer behaviour, circular infrastructure, innovation at company level, clear supply chains, and policies. Based on the empirical results, the central thesis of the thesis is thus confirmed: Sustainable textile consumption is a part of the environmental improvement and the transformation of the industry only when individual practices can be found in accessible, economical and institutionally supported circular fashion systems.

CONCLUSIONS

1. The analysis of recent literature on sustainable textile consumption and circular fashion identified that sustainable textile consumption is not merely a personal environmentally responsible behavior, but is a multi-level socio-technical process where consumer behavior, product design, circular business models, material flows, and governance aspects are all playing a part. The theoretical analysis revealed that the concepts of garment utilization, per-wear environmental impact, repair, reuse, resale, rental, recycling, traceability, and extended producer responsibility are the most important concepts in this field. The central theoretical finding is that the use of garments (defined as the number of times a particular garment is worn throughout its life) serves as the hub of the relationship between consumers and industry levels outcomes. The literature also shows that there are also some gaps in the evidence, particularly when it comes to harmonisation of measurement of the per-wear impacts, the incorporation of consumer behaviour data into LCA, and analyses of the impact of circular fashion models on global value chains and producing countries.

2. Based on the analysis of prevailing consumption patterns and secondary market development, the study revealed that sustainable textile consumption is in the process of becoming a part of the international consumers; however, it has not yet become a mainstream and a sustained fashion consumption. The empirical study of 279 consumers confirmed that consumers overall have a general awareness of sustainability and feel their decisions are having an impact on the fashion industry. However, reality of circularity is not homogeneous. Clothes donations or sales of unwanted clothes, and the use of clothes produced from recycled or organic materials are the most common sustainable practices, while clothing second-hand buying, renting and repairing are less common. This is a confirmation of the presence of an attitude-behaviour gap: consumers may be in favor of sustainability, but their behavior is limited by the price sensitivity, convenience, limited repair infrastructure, lack of availability of circular services, and continued fast-fashion behaviour. So the secondary markets and the circular channels clearly have a growth potential but the actual influence of the channel will depend on whether it can be taken from sporadic to regular use by consumers.

3. Policy and regulatory instruments were assessed and it was found that governance is a crucial factor when it comes to moving from more sustainable textile consumption to actual industry change, but that the quality of policy design and implementation, as well as institutional context, all plays a role in this. The results of the research revealed that compared to general government regulations, the technological innovation, transparency of the supply chain, and circular economy models were perceived better. This implies that consumers feel that concrete, tangible and supply chain oriented measures are more effective than general regulatory measures with inconclusive effects. The research also revealed that the implementation of extended producer responsibility, the use of durability labels, traceability systems and incentive schemes for repairing and microfiber mitigation measures can only facilitate sustainable consumption when associated with tangible circular results. Concurrently, the microfiber hypothesis could not be directly examined using survey data so it is recommended that future evaluations of the sustainability of textiles involve a combination of consumer survey and laboratory testing and life-cycle assessment. The use of policy instruments is thus needed, but these instruments need to be specific, evidence, internationally comparable and sensitive to society.

4. The thesis also found that sustainable textile consumption will enable to speed up the transition of the international fashion industry only if it is backed by the necessary infrastructure at the level of the user, credible information, and innovation at the level of the companies, as well as coordinated governance. The results show that fashion companies should redesign products for durability, reparability and recyclability, establish brand-led resale and rental programs, invest in product traceability technologies and use circular metrics like garment utilization, value retention per product, resource productivity, and not just sales volume or inventory turnover to assess performance. The study suggests that policy actors should enhance the credibility of eco-labels, ensure low-cost services for the circular economy, invest in repair and reuse infrastructure, and become more effective in designing EPR schemes that foster upstream product redesign, instead of just collecting more products. The study concludes that the development of sustainable textile consumption has the potential to lower environmental impacts and change the competitiveness of fashion worldwide, but this potential can be achieved only by systemic, economically viable and socially inclusive transitions to circular fashion.

RECOMMENDATIONS

This thesis led to a number of recommendations for key stakeholders in the transition towards sustainable textile consumption and circular fashion based on the theoretical analysis and empirical results. As the study shows, knowledge alone is not enough for consumer to shift the international fashion industry, the recommendations are given to concerted action among companies, policy makers, digital platforms, educational actors and future researchers.

- **Recommendations for international fashion companies and retailers.** There is a need to shift from symbolic to measurable sustainable communication in fashion companies towards circular business. The findings of this empirical study reveal that consumers are generally aware of the importance of sustainability and feel that they can influence the fashion industry, but their actions in relation to circular practices are limited. Companies should thus facilitate sustainable consumption, making it easier, more affordable and more convenient for consumers. This can be done by designing garments that are durable, repairable and recyclable; provide repair services; establish take-back programs, and establish brand-led resale or rental programs. Companies should also change their performance metrics from sales volume to garment utilization, value retention per garment, revenue per garment lifecycle, and resource productivity to reflect a circular measurement. These would enable companies to assess the value created for the environment as well as the long-term competitiveness of the business through circular strategies.
- **Recommendations for fashion brands regarding consumer trust and transparency.** Fashion companies need to further develop transparency and product information systems as the study shows that trust and information are relevant factors for the adoption of resale, rental and sustainable purchasing practices. Brands should offer transparent, valid and comprehensible product composition, longevity, repairability, origin of materials and environmental impact. Digital product passports, QR codes, traceability labels, authenticated resale certificate could reduce consumer uncertainty and boost the trust in second-hand and circular products. This is particularly relevant as empirical results show consumers' overall view of supply chain transparency as a positive strategy for sustainable fashion is high. Transparency is not just about a marketing strategy, it's about accountability and consumer choice.

- **Recommendations for policy makers and public institutions.** More specific and outcomes-oriented policy instruments for circular fashion should be created by policy makers. The empirical findings indicate that the general government regulations were rated lower than technological innovation and supply chain transparency and circular economy models. It implies that consumers can sense general rules don't work when they don't have a clear connection to market change. As a result, measures such as enhancing extended producer responsibility schemes, durability labelling, eco-design requirements, repair incentives and textile waste separation systems should be reinforced by the policy makers. These instruments, however, must be structured so as to incentivise observable circular benefits, such as extending the lifespan of garments, more repairs, higher rates of re-use and lower landfill disposal, etc. Regulations must not make it more expensive for companies to comply, but also incentivize redesigning products upstream and the building of circular infrastructure.
- **Recommendations for local authorities and circular infrastructure developers.** Local governments should invest in the development of accessible repair and reuse and second-hand infrastructure. The empirical results indicate that the local availability of circular services is not as expected and repair is one of the least adopted sustainable measures. This indicates that consumers can say that they want to be sustainable, but they are not when they are lacking, inconvenient or costly. Organizations like municipalities, local business associations, and non-governmental organizations should, therefore, facilitate repair workshops, community mending centres, second-hand centres, textile collection locations and the cooperation of retailers and repairers. This infrastructure would help to narrow the attitude–behaviour gap and increase the likelihood of circular consumption to become a part of everyday life, rather than exceptional or occasional.
- **Recommendations for digital resale and rental platforms.** Digital resale and rental platforms should have an improved Trust, Usability, Product Authentication and Logistical Efficiency. Therefore, the study offers limited evidence for the link between platform participation and circular behaviour and it is recommended that platforms engage in a strategy for occasional users to become frequent users. This calls for accurate product descriptions, open pricing, hygiene guarantees, consistent quality control, easy return policy and streamlined delivery services. Platforms should also signify whether their

services are more to do with adding to consumption, or with actual substitution with new purchase, as the environmental value of the rental and resale depends on the actual substitution. Platforms need to capture and publish information regarding garment use, reuse, repair and waste reduction to enhance their fashion sustainability footprint.

- **Recommendations for consumer education and communication actors** There is a need for more focus on behavior change and less on awareness raising in the areas of educational institutions, consumer organisations and actors in the field of sustainability communication. The results demonstrate that for many consumers, sustainability is a subject of awareness, which is not always reflected in buying second-hand or in rental or repair. Educational campaigns should thus give practical instructions on garment lifetime extension, how to find trusted eco-labels, how to wash garments in an eco-friendly manner and how to consider the actual environmental value of circular alternatives. Price sensitivity and convenience are also important elements of communication that would need to be addressed to convince consumers that a rational economic choice can be made in consuming sustainable textiles, by extending the duration of use of the product and respecting the right care.

This thesis argues overall that sustainable textile consumption should be systemic in order to develop it as a transition, and not a personal moral choice. More accessible options are needed for consumers, circular business incentives for companies, trustworthy infrastructure for platforms, and measurable and socially balanced instruments for policy makers. The combination of these factors can make a difference in the international fashion industry and start the process of sustainable textile consumption.

QASIM HAYAT (2026). Tvarios tekstilės vartojimo poveikis tarptautinei mados industrijai. Magistro baigiamasis darbas. Kaunas: Vilniaus universitetas Kauno fakultetas, 67 p.

SANTRAUKA

Šiame magistro darbe analizuojama, kaip besikeičiantys vartotojų tekstilės vartojimo įpročiai veikia tarptautinės mados industrijos transformaciją, verslo modelius, aplinkosauginius rezultatus ir politikos formavimo kryptis. Darbo aktualumas grindžiamas tuo, kad mados ir tekstilės sektorius išlieka viena iš daugiausia išteklių naudojančių, atliekų generuojančių ir aplinkai reikšmingą poveikį darančių pramonės šakų. Todėl tvarus tekstilės vartojimas, apimantis mažesnę vartojimą, ilgesnį drabužių naudojimą, taisymą, perpardavimą, nuomą, perdirbimą ir atsakingą šalinimą, tampa svarbia prielaida pereiti nuo linijinio prie žiedinio mados industrijos modelio.

Darbo objektas – tvaraus tekstilės vartojimo poveikis tarptautinei mados industrijai. Darbo tikslas – išanalizuoti, kaip tvaraus tekstilės vartojimo praktikos veikia tarptautinės mados industrijos pokyčius. Teorinėje darbo dalyje atskleidžiama, kad tvarus tekstilės vartojimas negali būti suprantamas tik kaip individualus vartotojo pasirinkimas. Tai yra daugialypis socialinis-techninis procesas, kuriame susijungia vartotojų elgsena, gaminių dizainas, žiedinės ekonomikos verslo modeliai, tiekimo grandinės skaidrumas, antrinės rinkos, taisymo infrastruktūra ir reguliacinės priemonės. Pagrindiniu teoriniu ryšiu darbe laikomas drabužio naudojimo intensyvumas, t. y. vidutinis kartų skaičius, kiek drabužis yra dėvimas per savo gyvavimo ciklą. Kuo ilgiau ir dažniau drabužis naudojamas, tuo mažesnis jo poveikis aplinkai vienam dėvėjimo kartui, tačiau ši nauda priklauso nuo skalbimo įpročių, logistikos, mikropluošto taršos ir galimo perteklinio vartojimo efekto.

Empirinė darbo dalis grindžiama kiekybiniu tyrimu, kuriame dalyvavo 279 vartotojai. Tyrimui struktūruoti buvo taikoma Tvaraus vartojimo poveikio vertinimo sistema, leidusi nuosekliai analizuoti vartotojų profilį, tvaraus elgesio formas, kliūtis ir skatinamuosius veiksnius, strategijų bei politikos veiksmingumo vertinimą, demografinius skirtumus ir hipotezių patikrinimą. Tyrimo rezultatai parodė, kad vartotojai pripažįsta tvarumo svarbą ir mano, jog jų pasirinkimai gali daryti poveikį mados industrijai. Vis dėlto nustatytas aiškus požiūrio ir elgsenos atotrūkis: nors tvarumas vartotojams atrodo reikšmingas, realus įsitraukimas į žiedinės praktikas išlieka ribotas.

Dažniausiai taikomos praktikos yra nereikalingų drabužių dovanojimas arba pardavimas ir drabužių iš perdirbtų ar organinių medžiagų pirkimas, o sudėtingesnės praktikos – taisymas, nuoma ir reguliarus pirkimas antrinėje rinkoje – taikomos gerokai rečiau.

Tyrimas atskleidė, kad pagrindinės tvaraus tekstilės vartojimo kliūtys yra kaina, patogumo stoka, ribota taisymo ir antrinio vartojimo infrastruktūra, nepakankamas pasitikėjimas platformomis bei ne visada aiškus politikos priemonių veiksmingumas. Respondentai palankiausiai vertino technologines inovacijas, tiekimo grandinės skaidrumą ir žiedinės ekonomikos modelius, o bendrosios valdžios reguliavimo priemonės buvo įvertintos silpniau. Tai rodo, kad vartotojai labiau pasitiki konkrečiomis, matomomis ir praktiškai pritaikomomis priemonėmis nei abstrakčiu reguliavimu. Hipotezių tikrinimas parodė, kad taisymo paslaugų prieinamumas ir išplėstinės gamintojo atsakomybės priemonių svarba pasitvirtino stipriausiai, platformų pasitikėjimo reikšmė pasitvirtino iš dalies, skalbimo įpročių įtaka buvo pagrįsta netiesiogiai, o mikropluošto taršos poveikiui įvertinti reikėtų papildomų laboratorinių arba gyvavimo ciklo analizės duomenų.

Darbo rezultatai leidžia teigti, kad tvarus tekstilės vartojimas gali tapti reikšmingu tarptautinės mados industrijos transformacijos veiksniu, tačiau tik tuo atveju, jei vartotojų motyvacija bus paremta prieinama infrastruktūra, patikima informacija, įmonių inovacijomis ir tinkamai suprojektuotomis politikos priemonėmis. Mados įmonėms rekomenduojama kurti ilgaamžius, taisomus ir perdirbamus gaminius, plėtoti perpardavimo, nuomos ir taisymo paslaugas, diegti atsekamumo sistemas ir vertinti veiklą ne tik pagal pardavimų apimtį, bet ir pagal drabužio naudojimo intensyvumą, vertės išlaikymą bei išteklių produktyvumą. Politikos formuotojams rekomenduojama stiprinti taisymo ir pakartotinio naudojimo infrastruktūrą, diegti patikimą ženklumą, skatinti žiedinės ekonomikos sprendimus ir kurti tokias išplėstinės gamintojo atsakomybės sistemas, kurios skatintų ne tik atliekų surinkimą, bet ir gaminių ilgaamžiškumą bei dizaino pokyčius.

Galima teigti, kad tvarus tekstilės vartojimas nėra trumpalaikė vartojimo tendencija, bet struktūrinė tarptautinės mados industrijos kaitos kryptis. Vis dėlto šiai kaitai būtinas sisteminis požiūris, kuriame vartotojų elgsena, verslo strategijos, technologinės inovacijos ir reguliacinės priemonės veiktų tarpusavyje suderintu būdu.

References

1. Ahmed, S., Liscio, M.C., Papamichael, I., Sospiro, P., Voukkali, I. and Zorpas, A.A., 2025. Life cycle assessment to advance the fashion industry's sustainability: A review. *Waste Management & Research*, p.0734242X251343793.
2. Akyildiz, S.H., Fiore, S., Bruno, M., Sezgin, H., Yalcin-Enis, I., Yalcin, B. and Bellopede, R., 2024. Release of microplastic fibers from synthetic textiles during household washing. *Environmental Pollution*, 357, p.124455.
3. Amasawa, E., Brydges, T., Henninger, C.E. and Kimita, K., 2023. Can rental platforms contribute to more sustainable fashion consumption? Evidence from a mixed-method study. *Cleaner and Responsible Consumption*, 8, p.100103.
4. Balasubramanian, M. and Sheykhmaleki, P., 2024. Comprehending the consumer behavior toward sustainable apparel. *Sustainability*, 16(18), p.8026.
5. Brooks, A., 2025. The International Second-Hand Clothing Trade: Contributions to Sustainability and the Circular Economy. *Sustainability*, 17(18), p.8397.
6. Carney Almroth, B.M., Åström, L., Roslund, S., Petersson, H., Johansson, M. and Persson, N.K., 2018. Quantifying shedding of synthetic fibers from textiles; a source of microplastics released into the environment. *Environmental Science and pollution research*, 25(2), pp.1191-1199.
7. Changing Markets Foundation. (2023). *The stealth export of waste plastic clothes to Kenya*. <https://changingmarkets.org/wp-content/uploads/2023/02/CM-Trashion-online-reports-layout.pdf>

8. Cheramie, L. and Balasubramanian, M., 2024. Sustainability Measures of the Apparel Industry: A Longitudinal Analysis of Apparel Corporations' Sustainability Efforts. *Sustainability*, 16(15), p.6681.
9. Ciechelska, A., Matel, A., Poskrobko, T. and Sidorczuk-Pietraszko, E., 2023. Circular economy rebound effect in the context of second-hand clothing consumption. *Economics and Environment*, 87(4), pp.635-20.
10. De Falco, F., Di Pace, E., Cocca, M. and Avella, M., 2019. The contribution of washing processes of synthetic clothes to microplastic pollution. *Scientific reports*, 9(1), p.6633.
11. Dinh, D.M. and Rüffel, E., 2024. Consumer Motivations in Fashion Resale-A Comparative Study of Vintage and Second-Hand Terminology.
12. Domingos, M., Vale, V.T. and Faria, S., 2022. Slow fashion consumer behavior: A literature review. *Sustainability*, 14(5), p.2860.
13. EEA (European Environment Agency), 2022. *Microplastics from textiles: towards a circular economy for textiles in Europe*. Available at: <https://www.eea.europa.eu/en/analysis/publications/microplastics-from-textiles-towards-a-circular-economy-for-textiles-in-europe>
14. Ellen MacArthur Foundation, 2020. *Vision of a Circular Economy for Fashion* (PDF). Available at: <https://content.ellenmacarthurfoundation.org/m/7a6b4c98ea57ce7b/original/Vision-of-a-circular-economy-for-fashion.pdf>
15. Fletcher, K. and Tham, M., 2019. Earth Logic: Fashion. *Action, research, plan*.

16. Global Fashion Agenda, 2019. Pulse of the Fashion Industry 2019 report. Available at: <https://globalfashionagenda.org/resource/pulse-of-the-fashion-industry-2019/>
17. Goedertier, F., Weijters, B. and Van den Bergh, J., 2024. Are consumers equally willing to pay more for brands that aim for sustainability, positive societal contribution, and inclusivity as for brands that are perceived as exclusive? Generational, gender, and country differences. *Sustainability*, 16(9), p.3879.
18. Halicki, D., Zaborek, P. and Meylan, G., 2024. Sustainable Fashion Choices: Exploring European Consumer Motivations behind Second-Hand Clothing Purchases. *Administrative Sciences*, 14(8), p.174.
19. Hazlehurst, A., Tiffin, L., Sumner, M. and Taylor, M., 2023. Quantification of microfibre release from textiles during domestic laundering. *Environmental Science and Pollution Research*, 30(15), pp.43932-43949.
20. Hernandez, L., Petreca, B., Baurley, S., Bianchi-Berthouze, N. and Cho, Y., 2024. Examining clothing repair practices, core competences, techniques, tools and community structures involved in extending the life of garments. *International Journal of Sustainable Fashion & Textiles*, 3(1), pp.99-121.
21. Jia, F., Yin, S., Chen, L. and Chen, X., 2020. The circular economy in the textile and apparel industry: A systematic literature review. *Journal of cleaner production*, 259, p.120728.
22. Klepp, I.G., Laitala, K. and Wiedemann, S., 2020. Clothing lifespans: What should be measured and how. *Sustainability*, 12(15), p.6219.

23. Klooster, A., Corona, B., Henry, M. and Shen, L., 2024. Do we save the environment by buying second-hand clothes? The environmental impacts of second-hand textile fashion and the influence of consumer choices. *Journal of Circular Economy*, 2(1).
24. Laitala, K. and Klepp, I.G., 2020. What affects garment lifespans? International clothing practices based on a wardrobe survey in China, Germany, Japan, the UK, and the USA. *Sustainability*, 12(21), p.9151.
25. Lant, N.J., Hayward, A.S., Peththawadu, M.M., Sheridan, K.J. and Dean, J.R., 2020. Microfiber release from real soiled consumer laundry and the impact of fabric care products and washing conditions. *PloS one*, 15(6), p.e0233332.
26. Leal Filho, W., Ellams, D., Han, S., Tyler, D., Boiten, V.J., Paço, A., Moora, H. and Balogun, A.L., 2019. A review of the socio-economic advantages of textile recycling. *Journal of cleaner production*, 218, pp.10-20.
27. Leclercq-Machado, L., Alvarez-Risco, A., García-Ibarra, V., Esquerre-Botton, S., Morales-Ríos, F., Anderson-Seminario, M.D.L.M., Del-Aguila-Arcentales, S., Davies, N.M. and Yáñez, J.A., 2022. Consumer patterns of sustainable clothing based on theory of reasoned action: Evidence from Ecuador. *Sustainability*, 14(22), p.14737.
28. Lundberg, P., Vainio, A., Viholainen, N. and Korsunova, A., 2024. Consumers and self-repair: What do they repair, what skills do they have and what are they willing to learn?. *Resources, Conservation and Recycling*, 206, p.107647.
29. Mandarić, D., Hunjet, A. and Vuković, D., 2022. The impact of fashion brand sustainability on consumer purchasing decisions. *Journal of Risk and Financial Management*, 15(4), p.176.

30. Mazanec, J. and Harantová, V., 2024. Gen z and their sustainable shopping behavior in the second-hand clothing segment: Case study of the Slovak Republic. *Sustainability*, 16(8), p.3129.
31. McQueen, R.H., Jain, A., McNeill, L.S. and Kozlowski, A., 2023. The role of resources in repair practice: Engagement with self, paid and unpaid clothing repair by young consumers. *Textile Research Journal*, 93(3-4), pp.576-591.
32. Millward-Hopkins, J., Purnell, P. and Baurley, S., 2023. A material flow analysis of the UK clothing economy. *Journal of Cleaner Production*, 407, p.137158.
33. Monticelli, A. and Costamagna, M., 2023. Environmental assessment of the rental business model: a case study for formal wear. *Environment, Development and Sustainability*, 25(8), pp.7625-7643.
34. Murtas, G. and Pedeliento, G., 2025. Investigating the Customer Journey in Second-Hand Fashion Platforms: Implications for Luxury Brand Management. *Journal of Consumer Behaviour*, 24(2), pp.655-672.
35. Negash, Y.T. and Akhbar, T., 2024. Building consumer trust in secondhand fashion: A signaling theory perspective on how consumer orientation and environmental awareness shape engagement. *Cleaner and Responsible Consumption*, 14, p.100211.
36. Niinimäki, K., 2013. *Sustainable fashion: New approaches*. Aalto University.
37. Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T. and Gwilt, A., 2020. The environmental price of fast fashion. *Nature reviews earth & environment*, 1(4), pp.189-200.
38. Nosratabadi, S., Mosavi, A., Shamshirband, S., Zavadskas, E.K., Rakotonirainy, A. and Chau, K.W., 2019. Sustainable business models: A review. *Sustainability*, 11(6), p.1663.

39. Nyman, T., 2024. The competitiveness of fashion resale: The significance of product presentation in the competitiveness of fashion resale.
40. Ostermann, C.M., Nascimento, L.D.S. and Zen, A.C., 2021. Business model innovation for circular economy in the fashion industry: a startups' perspective. *Frontiers in sustainability*, 2, p.766614.
41. Persson, O. and Hinton, J.B., 2023. Second-hand clothing markets and a just circular economy? Exploring the role of business forms and profit. *Journal of cleaner production*, 390, p.136139.
42. Pires, P.B., Morais, C., Delgado, C.J. and Santos, J.D., 2024. Sustainable fashion: Conceptualization, purchase determinants, and willingness to pay more. *Administrative Sciences*, 14(7), p.143.
43. Poldner, K., Overdiek, A. and Evangelista, A., 2022. Fashion-as-a-service: Circular business model innovation in retail. *Sustainability*, 14(20), p.13273.
44. Potdar, B., Makhal, A. and Sen, R.A., 2024. A Bibliometric Review of the Influencers of Clothing Life Extension Practices.
45. Ramasamy, R. and Subramanian, R.B., 2021. Synthetic textile and microfiber pollution: a review on mitigation strategies. *Environmental Science and Pollution Research*, 28(31), pp.41596-41611.
46. Rotimi, E.O.O., Daronkola, H.K., Topple, C. and Johnson, L., 2024. Behavioural determinants of consumers' intention to reuse end-of-life garments in Australia. *Cleaner Logistics and Supply Chain*, 10, p.100138.

47. Saadi, N. and Boulay, A.M., 2025. Microfibers in Life Cycle Assessment: Comparing the Physical Effects of Cellulosic and Synthetic Fibers via Characterization Factors Development.
48. Sandin, G. and Peters, G.M., 2018. Environmental impact of textile reuse and recycling—A review. *Journal of cleaner production*, 184, pp.353-365.
49. Schumacher, K.A. and Forster, A.L., 2022. Textiles in a circular economy: An assessment of the current landscape, challenges, and opportunities in the United States. *Frontiers in Sustainability*, 3, p.1038323.
50. Shen, B., Zhu, C., Li, Q. and Wang, X., 2021. Green technology adoption in textiles and apparel supply chains with environmental taxes. *International Journal of Production Research*, 59(14), pp.4157-4174.
51. Shirvanimoghaddam, K., Motamed, B., Ramakrishna, S. and Naebe, M., 2020. Death by waste: Fashion and textile circular economy case. *Science of the total environment*, 718, p.137317.
52. Textile Exchange, 2021. Preferred Fiber & Materials Market Report 2021. Available at: https://textileexchange.org/app/uploads/2021/08/Textile-Exchange_Preferred-Fiber-and-Materials-Market-Report_2021.pdf
53. Textile Exchange, 2023. Materials Market Report 2023. Available at: <https://textileexchange.org/app/uploads/2023/11/Materials-Market-Report-2023.pdf>
54. Thorisdottir, T.S. and Johannsdottir, L., 2020. Corporate social responsibility influencing sustainability within the fashion industry. A systematic review. *Sustainability*, 12(21), p.9167.

55. Tymoshchuk, O., Lou, X. and Chi, T., 2024. Exploring determinants of second-hand apparel purchase intention and word of mouth: a stimulus–organism–response approach. *Sustainability*, 16(11), p.4445.
56. UNEP (United Nations Environment Programme), 2018. *Putting the brakes on fast fashion* (web article). Available at: <https://www.unep.org/news-and-stories/story/putting-brakes-fast-fashion>
57. UNEP (United Nations Environment Programme). (2025). *Unsustainable fashion and textiles in focus for International Day of Zero Waste 2025*. <https://www.unep.org/news-and-stories/press-release/unsustainable-fashion-and-textiles-focus-international-day-zero>
58. Vassalo, A.L., Marques, C.G., Simões, J.T., Fernandes, M.M. and Domingos, S., 2024. Sustainability in the fashion industry in relation to consumption in a digital age. *Sustainability*, 16(13), p.5303.
59. Wiedemann, S.G., Biggs, L., Clarke, S.J. and Russell, S.J., 2022. Reducing the environmental impacts of garments through industrially scalable closed-loop recycling: life cycle assessment of a recycled wool blend sweater. *Sustainability*, 14(3), p.1081.
60. Wijerathne, H. and Logotheti, D., 2024. Exploring the Threads of Clothing Repair Practice: A Social Practice Approach to Clothing Repairs.
61. Winkler, A., 2023. Environmental performance of a t-shirt in a clothing rental: A case study using life cycle assessment.
62. WRAP, 2021. Changing Our Clothes: Why the clothing sector should adopt new business models. Available at: <https://pacecircular.org/sites/default/files/2021-03/WRAP-changing-our-clothes-why-the-clothing-sector-should-adopt-new-business-models.pdf>

63. Wren, B., 2022. Sustainable supply chain management in the fast fashion Industry: A comparative study of current efforts and best practices to address the climate crisis. *Cleaner Logistics and Supply Chain*, 4, p.100032.
64. Zhang, L. and Hale, J., 2022. Extending the lifetime of clothing through repair and repurpose: An investigation of barriers and enablers in UK citizens. *Sustainability*, 14(17), p.10821.
65. Jain, P., & Jain, R. (2025). Disposal methods of clothing used globally: A comparative review of developed and emerging economies. *International Journal of Plant Environment*, 11, 491–498. <https://doi.org/10.18811/ijpen.v11i03.07>
66. Ahmad, A., Madi, Y., Abuhashesh, M., Nusairat, N. M., & Masa'deh, R. (2020). The knowledge, attitude, and practice of the adoption of green fashion innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 6(4), 107. <https://doi.org/10.3390/joitmc6040107>
67. Aithal, A., & Aithal, P. S. (2020). Development and validation of survey questionnaire & experimental data – A systematical review-based statistical approach. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3724105>
68. Al-Halbousi, J. N. D., & Ali, M. H. (2021). The role of throughput accounting in maximizing profits: Application search in the general company for textile industry/cotton factory. *Journal of Economic and Administrative Sciences*, 27(129), 234–246. <https://doi.org/10.33095/jeas.v27i129.2187>
69. Andika, A., Ernestivita, G., Anisah, T.N., Hidayati, L., Joshi, M.C., 2025. The Role of Social Media in Sustainable Fashion Adoption: Examining Psychological Mechanisms and Financial Constraints. *J. Sustain. Mark.* 1–30. <https://doi.org/10.51300/JSM-2025-144>

70. Azad, M. A. (2025). Evaluating the role of lean manufacturing in reducing production costs and enhancing efficiency in textile mills. TechRxiv. <https://doi.org/10.36227/techrxiv.175459830.02641032/v1>
71. Bato, V., Kašťáková, E., 2025. Circular economy in international trade: challenges and opportunities for global value chains. *Front. Sustain.* 6, 1681061. <https://doi.org/10.3389/frsus.2025.1681061>
72. Bayai, I., Aluko, T. O., & Chimutanda, M. V. (2024). Effectiveness of government intervention in the private sector: Policy implications for legislators. *Corporate Law and Governance Review*, 6(4), 63. <https://doi.org/10.22495/clgrv6i4p6>
73. Brooks, A. (2025). The international second-hand clothing trade: Contributions to sustainability and the circular economy. *Sustainability*, 17(18), 8397. <https://doi.org/10.3390/su17188397>
74. Espuny, M., Reis, J. S. D. M., Giupponi, E. C. B., Rocha, A. B. T., Costa, A. C. F., Poltronieri, C. F., & Oliveira, O. J. D. (2025). The role of the triple helix model in promoting the circular economy: Government-led integration strategies and practical application. *Recycling*, 10(2), 50. <https://doi.org/10.3390/recycling10020050>
75. Gray, S. L. M. (2023). Reducing the environmental impact of the fashion industry: An assessment of different business models [Doctoral thesis]. University of Surrey. <https://doi.org/10.15126/THESIS.900900>
76. Guo, X., Wang, L., Guo, Y., & Liu, Y. (2024). The impact of sustainable consumption behaviour on natural resource conservation in China: A cross-sectional analysis. *Resources Policy*, 89, 104610. <https://doi.org/10.1016/j.resourpol.2023.104610>

77. Kazancoglu, I., Sagnak, M., Kumar Mangla, S., Kazancoglu, Y., 2021. Circular economy and the policy: A framework for improving the corporate environmental management in supply chains. *Bus. Strategy Environ.* 30, 590–608. <https://doi.org/10.1002/bse.2641>
78. Khumorikov, A. (2025). Sustainable laundry practices and microplastic pollution: Behavioral insights and strategies for reducing environmental impact [Thesis]. University of Alberta Library. <https://doi.org/10.7939/83323>
79. Liu, X., Tse, Y.K., Wang, S., Sun, R., 2023. Unleashing the power of supply chain learning: an empirical investigation. *Int. J. Oper. Prod. Manag.* 43, 1250–1276. <https://doi.org/10.1108/IJOPM-09-2022-0555>
80. Mehta, N.K., Bhattacharyya, S.S., Pandey, N., 2022. Empirical investigation regarding ethical decision making: a stakeholder cross-impact analysis (SCIA). *Int. J. Ethics Syst.* 38, 444–464. <https://doi.org/10.1108/IJOES-07-2021-0149>
81. Organisation for Economic Co-operation and Development. (2021). Modulated fees for extended producer responsibility (EPR) schemes (OECD Environment Working Papers No. 184). OECD Publishing. <https://doi.org/10.1787/2a42f54b-en>
82. Munro, P., Kapitan, S., & Wooliscroft, B. (2023). The sustainable attitude-behavior gap dynamic when shopping at the supermarket: A systematic literature review and framework for future research. *Journal of Cleaner Production*, 426, 138740. <https://doi.org/10.1016/j.jclepro.2023.138740>
83. Ogilvie, D., Adams, J., Bauman, A., Gregg, E.W., Panter, J., Siegel, K.R., Wareham, N.J., White, M., 2020. Using natural experimental studies to guide public health action: turning the evidence-based medicine paradigm on its head. *J. Epidemiol. Community Health* 74, 203–208. <https://doi.org/10.1136/jech-2019-213085>

84. Ostojic, S., Traverso, M., 2024. Application of Life Cycle Sustainability Assessment in the automotive sector – A systematic literature review. *Sustain. Prod. Consum.* 47, 105–127. <https://doi.org/10.1016/j.spc.2024.03.033>
85. Panju, M., 2024. What Goes Around Comes Around?: The Sustainability Paradox of Second-Hand Clothing Marketplaces in a Cross-Cultural Context. *East Afr. J. Interdiscip. Stud.* 7, 1–27. <https://doi.org/10.37284/eajis.7.1.1799>
86. Pruess, J.T., 2023. Unraveling the complexity of extended producer responsibility policy mix design, implementation, and transfer dynamics in the European Union. *J. Ind. Ecol.* 27, 1500–1520. <https://doi.org/10.1111/jiec.13429>
87. Saunders, M.N.K., Darabi, F., 2024. Using multi- and mixed methods research designs, in: Parker, J., Donnelly, N., Ressia, S., Gavin, M. (Eds.), *Field Guide to Researching Employment and Industrial Relations*. Edward Elgar Publishing, pp. 71–87. <https://doi.org/10.4337/9781035313891.00018>
88. Scarbrough, H., Sanfilippo, K. R. M., Ziemann, A., & Stavropoulou, C. (2024). Mobilizing pilot-based evidence for the spread and sustainability of innovations in healthcare: The role of innovation intermediaries. *Social Science & Medicine*, 340, 116394. <https://doi.org/10.1016/j.socscimed.2023.116394>
89. Shekari, M., Arasteh, H., Sheikhi Fini, A., & Vahidinasab, V. (2021). Demand response requirements from the cultural, social, and behavioral perspectives. *Applied Sciences*, 11(23), 11456. <https://doi.org/10.3390/app112311456>
90. Singh, A. K., Kumar, V. R. P., Irfan, M., Mohandes, S. R., & Awan, U. (2023). Revealing the barriers of blockchain technology for supply chain transparency and

sustainability in the construction industry: An application of Pythagorean FAHP methods. Sustainability, 15(13), 10681. <https://doi.org/10.3390/su151310681>

91. Soyer, M., & Dittrich, K. (2021). Sustainable consumer behavior in purchasing, using and disposing of clothes. Sustainability, 13(15), 8333. <https://doi.org/10.3390/su13158333>

92. Sree, B., & Kavitha, R. (2024). Fashion dynamics: Exploring demographic influences on clothing purchases. BIMTECH Business Perspectives. <https://doi.org/10.1177/25819542241286212>

93. Tölkes, C., 2020. The role of sustainability communication in the attitude–behaviour gap of sustainable tourism. Tour. Hosp. Res. 20, 117–128. <https://doi.org/10.1177/1467358418820085>

94. Youssef, N., Saleeb, M., Gebreal, A., & Ghazy, R. M. (2023). The internal reliability and construct validity of the Evidence-Based Practice Questionnaire (EBPQ): Evidence from healthcare professionals in the Eastern Mediterranean Region. Healthcare, 11(15), 2168. <https://doi.org/10.3390/healthcare11152168>

Appendices

Appendix 1. Survey Questionnaire

Research Survey: The Impact of Sustainable Textile Consumption on the International Fashion Industry

This questionnaire is part of a Master's thesis research at Vilnius University Kaunas Faculty. All responses are anonymous and will be used solely for academic purposes. The survey takes approximately 10–15 minutes to complete.

SECTION A: DEMOGRAPHIC PROFILE

A1. What is your age group?

☐ Under 18 ☐ 18–24 ☐ 25–34 ☐ 35–49 ☐ 50 or above

A2. How often do you purchase clothing items?

☐ Rarely (less than once a month) ☐ 1–2 times per month ☐ 3–5 times per month ☐ More than 5 times per month

A3. What is your typical spending per sustainable clothing item?

☐ Under €25 ☐ €25–€50 ☐ €50–€100 ☐ €100–€200 ☐ Over €200

SECTION B: SUSTAINABLE CONSUMPTION BEHAVIOUR

B1. Which of the following sustainable practices do you currently engage in? (Select all that apply)

☐ Donating or selling clothes I no longer need ☐ Buying recycled or organic materials ☐ Buying second-hand or pre-owned clothing ☐ Renting clothes for special occasions ☐ Repairing or altering clothes instead of replacing them ☐ None of the above

B2. How important is sustainability when making clothing purchase decisions? (1 = Not important at all; 5 = Extremely important)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

B3. How do you perceive the impact of your purchasing decisions on the fashion industry?

☐ No impact ☐ Little impact ☐ Moderate impact ☐ Strong impact ☐ Very strong impact

B4. How frequently do you use second-hand, rental, or repair services?

☐ Very rarely or never ☐ Sometimes ☐ Regularly ☐ Often ☐ Very often

SECTION C: PURCHASE DECISION FACTORS

C1. Please rate the importance of the following factors in your clothing purchase decisions (1 = Not important; 5 = Very important):

Price: 1 2 3 4 5 | Durability: 1 2 3 4 5 | Brand reputation: 1 2 3 4 5 |
Aesthetics/Style: 1 2 3 4 5 | Material composition: 1 2 3 4 5

SECTION D: COST AND ACCESS BARRIERS

D1. The high cost of sustainable clothing is a significant barrier for me. (1 = Strongly disagree; 5 = Strongly agree)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

D2. Please rate the quality and availability of local second-hand stores and repair services in your area. (1 = Very poor; 5 = Excellent)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

D3. How would you rate the availability of eco-labels and sustainability information on clothing products? (1 = Very poor; 5 = Excellent)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

SECTION E: STRATEGY AND POLICY EFFECTIVENESS

E1. Please rate the effectiveness of the following strategies in promoting sustainable fashion (1 = Not effective; 5 = Very effective):

Government environmental regulations: 1 2 3 4 5 | Circular economy models (e.g., take-back programmes): 1 2 3 4 5 | Consumer education campaigns: 1 2 3 4 5 | Technological innovation in eco-friendly materials: 1 2 3 4 5 | Supply chain transparency and traceability: 1 2 3 4 5

E2. How effective do you consider the current policies in your country in promoting sustainable fashion?

☐ Very ineffective ☐ Ineffective ☐ Neutral ☐ Effective ☐ Very effective

SECTION F: CIRCULAR ECONOMY PARTICIPATION (RENTAL, RESALE, REPAIR)

F1. How many garments did you rent in the past 12 months?

☐ None ☐ 1–2 garments ☐ 3–5 garments ☐ 6 or more

F2. What are your primary reasons for purchasing second-hand clothing? (Select all that apply)

☐ Cost savings ☐ Uniqueness/vintage appeal ☐ Environmental reasons ☐ Quality at lower price
☐ I do not purchase second-hand clothing

F3. Would you purchase authenticated second-hand items if a trust mechanism (e.g., quality guarantee, hygiene certificate) were provided?

☐ Definitely yes ☐ Probably yes ☐ Unsure ☐ Probably not ☐ Definitely not

SECTION G: POLICY AND GOVERNANCE EVALUATION

G1. Are you aware of Extended Producer Responsibility (EPR) policies related to textile waste in your country?

☐ Yes, fully aware ☐ Somewhat aware ☐ Not aware

G2. In your view, should extended producer responsibility (EPR) be broad (covering all textile categories) or narrow (focusing on specific garment types)?

☐ Broad coverage (more effective) ☐ Narrow coverage (more targeted) ☐ No preference ☐ I am not sure

Thank you for participating in this survey. Your responses contribute to important research on sustainable fashion and its impact on the international textile industry.