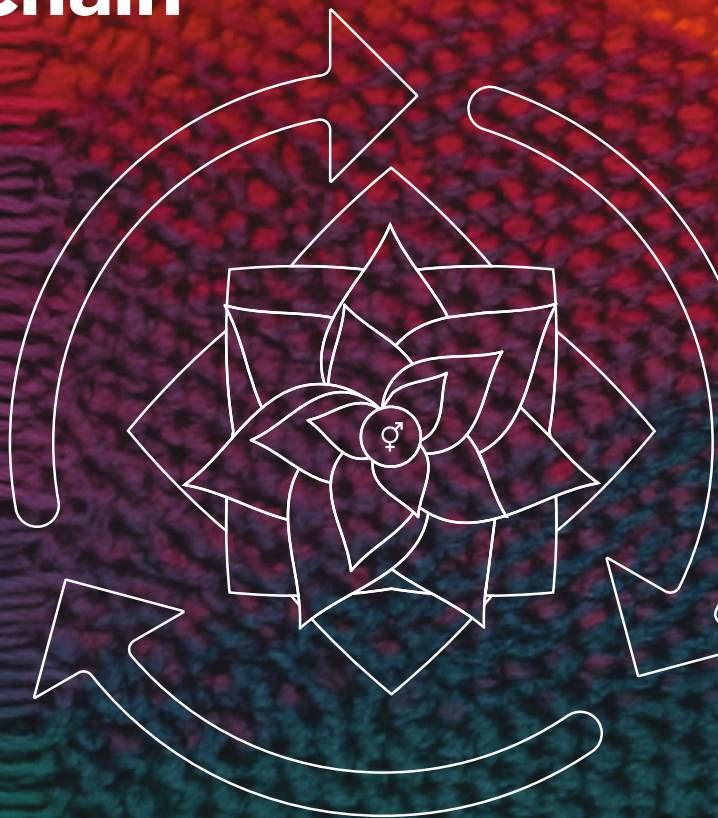


Towards a Just and Transformative Circular Economy Transition in the Textile and Apparel Value Chain



Lis Johana Suárez-Visbal

Towards a Just & Transformative Circular Economy Transition in the Textile and Apparel Value Chain

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COLOFON

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Towards a Just and Transformative Circular Economy Transition in the Textile and Apparel Value Chain

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List of Abbreviations

BAU	Business as Usual
B2C	Business to Consumer
B2B	Business to Business
CAO	Collective Labor Agreement
C2C	Consumer to Consumer
CBME	Circular Business Model Experimentation
CE	Circular Economy
CJ	Circular Jobs
CSs	Circular Strategies
DfD	Design for Disassembly
DfEoL	Design for End-of-Life
DIY	Do it yourself
EOL	End-of-Life
EPR	Extended Producer Responsibility
GE&I	Gender Equality and Inclusion
GEC	Gender Equality Continuum
HR	Human Resources
IGWG	International Gender Working Group
JCET	Just Circular Economy Transition
JT	Just Transition
LCA	Life Cycle Assessment
LOFs	Letters of the Future
MFA	Material Flow Analysis
MI	Material Inflow
MR	Material Recirculation
OCCE	Organizational Change Management for CE Studies
OCM	Organizational Change Management
PDFs	Positive Desirable Futures
PFF	Positive Future Framework
QOJ	Quality of jobs
SIAF	Social Impact Assessment Framework
SIAF-CE ☞	Social Impact Assessment Framework for Circular Economy
SL	Sustainable Livelihood/ Well-being
SME	Small and Medium Enterprises
SSH	Social Science and Humanities

STE	Sustainability Transition Experiment
STEM	Sciences, Technology, Engineering and Maths
TAVC	Textile and Apparel Value Chain
TCFs	Transformative Circular Futures
TS	Transformative Scenarios
VC	Value Chain
WR	Waste Reduction
♀	Female Worker
♂	Male Worker


Preface

My story with textiles began when I volunteered in Asia in 2004. I found myself first in Thailand, sharing my life with amazing young women whose days went by dying textiles, using handlooms, and crafting beautiful scarves. Later, I went to India, where the world of natural dyes, cotton culture, and embroidery bewitched me. I found it astonishing how many hours were spent harvesting, spinning, bleaching, dyeing, cutting, designing, and assembling such beautiful, almost artwork pieces sold for so little and discarded after just a few uses.

For over 13 years, I directed an NGO that collaborated with gifted tailors in Mali, indigenous crochet masters in northern Colombia, eco-designers, and tailors striving to make a living in Canada. A common thread among all these women producers was their commitment to work on a sustainable way with care for the planet. Yet also common was the lack of voice, representation, stable income, and support they had. Today, millions of women (and men) globally working in the sector face similar challenges. These women, their conviction to do business otherwise and the awareness of the systemic barriers they endure shape the social justice fabric of my PhD. Their stories have inspired my exploration of how a Circular Economy can simultaneously address environmental and social justice considerations in the textile and apparel value chain.

Looking forward into the future, I believe textiles will remain ubiquitous to our existence. Maybe the sourcing of materials will change, I hope the amount we use, and how many times we use it, but textiles and their function in our lives will prevail. As inherent as they are to our past, present, and future, I hope with this thesis, to have contributed to the ongoing rethinking process on the values and economic model behind the making, trade and care of textiles and apparel. For only when we make less but better textiles, value their makers in a just and equitable manner, trade textiles, care for them and dispose them and their outputs -in a more conscious manner- we could contribute to nurture a transformative economic, ecological, and social system for makers and users and for their generations to come across the globe.

To my family, to those present today and to those absent but never forgotten.



***“We are largely oblivious of the
existence of textiles in our lives and to
the knowledge and effort embodied in
any scrap of fabric”***

Virginia, Postrel

1

Introduction

1.1 Brief historical context

Textiles are a quintessential material, close to humankind. Common to all inhabitants of the world, textiles are not only part of our wardrobe but are present omnipresent in our lives and have been for millennia. As Postrel, (2020) says, “ever since we are born, our connection with textiles starts. Textiles keep us warm, dry us, dress our bedroom and bathrooms, and carpet our floors” (pg 3). They are in the seatbelts and cushions of our cars and insulate our walls from cold and noise and keep our crops protected. Textiles are present on the canvas of the art masterpieces we admire; they are in the hospitals, in protective masks, and when our life is no longer, we are also wrapped in textiles in almost all cultures around the world.

Textiles have also played a pivotal role in the economic development of many countries (De Souza et al., 2010; Franco, 2017; Ozturk et al., 2016). Their trade has contributed to shaping the deep socio-economic asymmetries present today in the world. Since pre-industrial times, Europe’s textile industry, centered on wool, linen, and silk processing, fueled colonial expansion by driving the demand for Indian fabrics and integrating them into global trade (Beckert, 2014; Clark, 2007). The Industrial Revolution transformed the sector with innovations like the spinning jenny and power loom, enabling mass production and urbanization while relying on colonial raw materials and exploiting workers, especially women and children (Clark, 2007; English, 2013).

Already established globally in the 20th century, manufacturing started slowly shifting to lower-income countries due to cheaper labor, free trade agreements, and fewer regulations (Kozlowski et al., 2012). This translocation of production to the global south reshaped the global textile supply chains. By the start of the 21st century, manufacturing had largely migrated to the global south (Fukunishi et al., 2013). Meanwhile, fast fashion and ultra-fashion emerged, prioritizing mass production, low costs, and rapid trend cycles, resulting in massive textile waste (Bhardwaj & Fairhurst, 2010; Fletcher, 2010; Foroohar, 2005).

Today the textile and apparel value chain (TAVC) comprises the textile industry, the fashion and apparel industry, and the textile recycling industry, out of which apparel is the principal output of the textiles produced in the world (Niinimäki et al., 2020). It is a fragmented, global network of large brands, small and medium enterprises (SME), independent workshops, and informal workers, marked by asymmetrical production relations, power dynamics, and lack of transparency (Godart, 2014; Hale & Wills, 2008; Noto La Diega, 2019). Lucrative activities like design and distribution happen in high-income countries, where brands with their purchasing capacity wield disproportionate power, leaving

factories and workers in low-income nations vulnerable. Meanwhile, low-value production activities dominate global south countries, such as raw material extraction and yarn manufacturing.

To attract foreign investment, these countries compete by maintaining low labor costs and lax socio-environmental regulations. As a result, workers' livelihoods are sacrificed at the expense of high-fashion consumption in the global north (Ferronato & Torretta, 2019; Niinimäki et al., 2020). Additionally, textile waste is often shipped to these nations, where a web of informal workers sorts, collects and disposes of the materials (Lindberg, 2023). Due to inadequate waste management facilities and practices, local resources such as water and land are polluted, affecting the health and well-being of informal workers, too (Giusti, 2009). These characteristics have shaped the unsustainable practices observed today in the sector.

1.2 Sustainability challenges and TAVC

The extraction, production, and consumption embedded in our economic system are human activities that have an increasing negative impact on the planet (Meadows et al., 2017). Their effects limit the earth's capacity to fulfil the necessary supply of limited resources and restrict its capacity to act as a sink for pollution (Rockström et al., 2009). According to Persson et al., (2022) and Richardson & Zolkos, (2023), these "Anthropocene activities" (of human nature) have contributed to the surpassing of six out of nine planetary boundaries that are considered critical for life on our planet¹. Meanwhile, at the backdrop of this environmental crisis, poverty, and increasing inequality are unevenly present worldwide (Peake & Kenner, 2020). As over 40% of the global population struggles to meet basic needs, including food, water, sanitation, and healthcare (Raworth, 2017).

The production and consumption of textiles and apparel exemplify this complex socio-environmental crisis. The TAVC has been defined by many as the epitome of the take-make-waste model (Brydges et al., 2022; Buchel et al., 2018). Valued at over \$3 trillion, it accounts for 4% of worldwide exports (McKinsey, 2022). The sector contributes directly and indirectly to environmental degradation, resource depletion, ocean acidification, and climate change (Brydges et al., 2022; Buchel et al., 2018).























































¹ Those being climate change, biodiversity loss, land use change, toxic novel entities, freshwater change, and phosphorus and nitrogen cycles.

Table 1.1 gives an indication of where the most relevant environmental and social impacts on the TAVC are placed and their estimated overall impact (last column). The size of the circle signifies a larger impact. As seen in Table 1.1, the sector emits 6-8% of the world's CO₂ (Sharpe, 2022b). It uses 25% of the world's chemicals, accounts for 20% of industrial wastewater pollution and 9% of the release of microplastics into the ocean (Charter et al., 2023; UNEP, 2020). Furthermore, 85% of global textile production is discarded shortly after being produced and sold, with only 1% being recycled in the sector (Ellen MacArthur Foundation, 2017) all of which have critical repercussions for aquatic and terrestrial biodiversity, as their environment and food supply get poisoned and polluted (Bhatia et al., 2017).

From a social angle, despite employing one in six people globally (Charter et al., 2023; UNEP, 2020), low wages are prevalent across the value chain (see Table 1.1) where 98% of workers earn less than a living wage in their respective countries (Charter et al., 2023). Some workers do not even make the minimum wage, contributing to engrossing the lines of the "working poor" (Asia Floor Wage Alliance, 2016; International Labor Organization, 2019). Additionally, job informality is also widely spread across all stages of value chain (Ascoly, 2009; Musiolek et al., 2020; Russell, 2020). This leaves most workers without representation, rights, social protection, or job security (Phillips, 2018; Priya & Gupta, 2020; WIEGO, n.d.).

Furthermore, the sector is highly feminized (75% of the workforce are females), with women predominantly occupying the most vulnerable positions (Fletcher & Tham, 2014; Neetha, 2002) and suffering from gender pay gaps throughout the value chain (Vijayarasa & Liu, 2022). The interconnected socio-environmental crises, compounded by deep systemic asymmetries, render the sector unsustainable (Brydges et al., 2022) unequal and unjust; (Buchel et al., 2018; Pugh et al., 2024). This underscores the need for a profound change in how textiles and apparel are produced and consumed, exemplifying the deep transformation we need as a society to ensure a healthy and just planet for future generations.

Table 1.1 Socio-environmental impacts in the TAVC. The larger the circle the greater the impact. This table was built using several sources that use different assessment methods and include different points of reference. As a result, this table should be seen as an illustrative overview of the combined socio environmental impact in the sector and not as a hard numerical statistic.

Environmental & Social Impacts/Value Change Segment	Material Extraction	Yarn Manufacturing	Clothing Manufacturing	Distribution	End-of-Life (EOL)	Overall Impact
						6-8% of the world's CO ₂ (Sharpe et al., 2022b).
						80% of land use happen outside Europe. The sector has the third highest impact on land use. (EEA, 2024).
						20% of industrial wastewater comes on manufacturing. (Kant, 2012). Up to 9% of microplastics produced at EOF (UNEP, 2020).
						Textiles' water consumption occupy the third place, after food and recreation (EEA, 2024).
						25% industrial waste produced globally, Reverse Resources (2017). 82% of the 6.95MT in European textile waste is post consumption waste (EEA, 2024).
						(EEA, 2022; Asia Floor Wage Alliance, 2016; Down to Earth, n.d. and Brent et al., 2021).
						Informality is persistent specially in production countries (Russell, 2020; Musiolek et al., 2020; Priya & Gupta, 2020).
						Gender inequality is present through the value chain (Phillips, 2018; Gregson et al., 2016).
						(ETUI, 2019; Phillips, 2018; WIEGO, n.d.)

1.3 Conceptualization of Circular Economy and levels of implementation

While the linear economy, characterized by the take-make-waste model, is seen as a major contributor to the multiple socio-environmental crisis, the Circular Economy (CE) has been proposed in the past few years as a systemic intervention to address sustainable development. It aims to reduce the input of raw materials and resources and reduce waste output by slowing, narrowing, and closing resource loops, keeping materials and products in the system longer (Achterberg et al., 2016; Stahel & Clift, 2015).

Although CE lacks a universally agreed-upon theoretical framework (Calisto Friant et al., 2024) its origins can be traced back to industrial ecology and resource efficiency literature. Antikainen et al., (2018) and Winans et al., (2017) noted that CE concepts have evolved in a dynamic and often chaotic manner, with little consensus among scholars. However, growing interest from academics, businesses, and policymakers over the past decade has helped streamline its definition, scope, and development to a great extent. Though some tensions persist, there is broad agreement on its conceptual development through distinct waves (Blomsma & Brennan, 2017; Calisto Friant et al., 2024; Reike et al., 2018) and on its different levels of implementation.

According to these authors the first CE conceptual wave focused on technological and material efficiency. It emphasized closed-loop systems, recycling (Frosch & Gallopoulos, 1989), industrial ecology (McDonough, 2002) to minimize waste and optimize resource use. The second wave, emerging in the early 2000s, introduced value chain integration and circular business models to address lifecycle impacts and foster cross-sectoral collaboration. During this period, the environmental sustainability dimension of CE received significant attention at both policy and practitioners' levels across various sectors (Achterberg et al., 2016; EMF, 2017; Ghisellini et al., 2016).

The third and most recent wave of CE is still evolving, positioning CE as a key pathway to sustainability. In this wave, strong criticism has emerged regarding the lack of social and political dimensions in CE discourse. Scholars called for more transformative approaches integrating social justice, equity, and political considerations into CE frameworks (Lazarevic & Valve, 2017; Millar et al., 2019). These perspectives emphasize justice, workers' and communities' well-being (Clube & Tennant, 2022; Raworth, 2012) democratization of power, and wealth redistribution (Pansera et al., 2021). With some even referring to it as the circular society (Calisto Friant et al., 2020). However, this dimension remains

largely underexplored, representing less than 17% of published CE articles in 2019 (Calisto Friant et al., 2024). This dissertation belongs to this current wave.

CE operates at different systemic levels: the micro, meso, and macro levels. At the micro level, it involves individuals, organizations, and businesses (Guzzo et al., 2022; Kirchherr et al., 2017) such as large incumbents, SMEs, and start-ups. Within the TAVC, SMEs warrant particular attention, as they account for over 60% of employment in the sector (Cusolito et al., 2016; Notten, 2020). The meso level includes industrial parks where actors in close geographic proximity collaborate by sharing resources like water, energy, and infrastructure (Ghisellini et al., 2016; Su et al., 2013). At the macro level, CE implementation occurs across large value chains, regions, or countries.

This thesis explores both the micro and macro levels of the CE operationalization. At the micro level, it explores how businesses operate internally and how they deal with both social and environmental considerations in their activities. At the macro level, this dissertation examines current CE policies in Europe and their impact on other critical global south nations in the TAVC.

1.4 Circular Economy as a pathway to sustainability and its challenges in the TAVC

In the TAVC, CE is seen as a critical solution to address resource scarcity (Homrich et al., 2018; Stahel & Cliff, 2016) and advance multiple Sustainable Development Goals (SDGs) by integrating socio-environmental considerations. CE offers significant potential benefits, such as reducing biodiversity loss and water scarcity by adopting regenerative agricultural practices that prevent deforestation and promote water reuse in fiber cultivation (Borrello et al., 2020; Geissdoerfer et al., 2017). It can also lower CO₂ emissions through the use of renewable energy, crucial for energy-intensive processes like textile manufacturing and recycling (Velenturf & Purnell, 2021). Additionally, CE optimizes material and product lifecycles, reducing waste and generating employment opportunities (Millar et al., 2019).

Despite this promise, several challenges hinder CE adoption in the sector, at the business, consumer, and policy dimension. Within the consumer dimension, cultural biases against used clothing and the higher cost of sustainable and circular options limit uptake (Hobson & Lynch, 2016; Kirchherr et al., 2018). At the policy dimension, inadequate fiscal and financial incentives make circularity less viable. For instance, global import tariffs of 19.2% for remanufactured goods (OECD, 2016; Suarez-Visbal et al., 2023) and the absence of textile gate fees encourage landfilling over recycling (Jia et al., 2020).

While for businesses, significant barriers have been already identified in literature, including financial constraints (Pheifer, 2017; Vermunt et al., 2019), high investment costs, technological limitations (Guldmann & Huulgaard, 2020) and market challenges such as secondary material scarcity and lack of standardization (de Jesus & Mendonça, 2018). These factors disproportionately impact small and medium-sized enterprises (SMEs), deterring their transition to circular models (Ghisellini et al., 2016; Henry et al., 2020).

At the business level, a critical challenge that remains underexplored is the lack of systems thinking and systems change in the CE implementation (Callorda Fossati & Bauler, 2022; Graessler et al., 2024). Systems thinking is critical to understand the interconnectedness of organizational elements (Meadows, 1999; Wachter, 2011) and their influence on CE adoption. Without this holistic approach, trade-offs between social and environmental goals are likely. Furthermore, several studies highlighted the lack of justice and social considerations in CE within the TAVC (Fletcher, 2010; Kirchherr et al., 2017; Padilla-Rivera et al., 2020). As the sector is highly feminized, women, disproportionately represented in low-paid and vulnerable roles, face heightened risks from low-quality job creation and job displacement during the CE transition (Brydges et al., 2022). These gaps undermine CE's transformational potential to rebalance social equity with environmental sustainability. Therefore, addressing the lack of systems thinking, social impact and justice-considerations—is essential for envisioning a just and transformative circular future.

1.5 Critical gaps identified by this dissertation on the CE operationalization in the TAVC

1.5.1 The weak social focus

Recent studies around social considerations on the CE transition such as Clube & Tennant, (2022); Pansera et al., (2021) and Lazarevic & Valve, (2017), have primarily focused on conceptualizing “what” should be included in CE's social dimension. At the business level, this CE dimension has primarily been explored through the narrow lens of job creation (Millar et al., 2019). Recently, this dimension has also been studied from the perspective of human resource management and circularity (Chiappetta Jabbour et al., 2019) and from the perspective of CE corporate culture (Bertassini et al., 2021).

However, beyond defining “what” constitutes the social dimension, significant gaps remain in understanding “how” this social dimension is implemented. For example, little is known about the effects of CE on workers and communities where circular strategies (CS) are implemented. Key questions about the

quality of circular jobs and how the circular transition impacts workers remain unanswered, highlighting the need for empirical research on how businesses can effectively operationalize socially equitable and just transitions within CE.

Additionally, there is a limited scope of social impact assessments within CE research. Most CE assessment methods prioritize environmental and economic impacts, often neglecting social factors (Corona et al., 2019; Geissdoerfer et al., 2017). While existing social assessment frameworks in sustainability could be adapted for CE, they often focus on production-related issues in the Global South. This overlooks Global North's labor-intensive circular strategies, such as Repair, Remanufacturing, and Recycling, which are critical to CE and require dedicated social impact evaluations (Elia et al., 2017; Iacovidou et al., 2017; Merli et al., 2018). Furthermore, given that the TAVC is labor-intensive and highly feminized, incorporating workers' and gender perspectives in the CE social assessing methods will address the concerns of the most vulnerable populations. This ensures diverse and inclusive approaches that support a just circular transition (Pugh et al., 2024).

1.5.2 Limited systems thinking at the business level

Businesses play a pivotal role in operationalizing CE (Callorda Fossati & Bauler, 2022). Understanding how internal systems within businesses change during the transition from linear to circular models is crucial (Guzzo et al., 2022). This understanding requires examining internal rules and regulations, stakeholder roles, interdepartmental relationships, and mental models (Kania et al., 2018) referred to as corporate culture in organizational change management (OCM) studies.

We argue that CE operationalization at the business level involves the interplay between physical and socio-economic systems, often referred to as hard and soft aspects in OCM (Graessler et al., 2024). The physical system (hard aspects) addresses environmental-business models and technological concerns, aiming to reduce critical material flows such as raw material inputs and waste outputs. In contrast, the socio-economic system (soft aspects) focuses on human and social dynamics, where subjective consciousness and non-rational motivations significantly influence decision-making (Gong, 2022). The soft aspects include, as explained before, corporate culture encompassing values, behaviors, and corporate mindset (Bertassini et al., 2021), human resource management (Chiappetta Jabbour et al., 2019) and impacts on workers and nearby communities. Additionally, as CE in the TAVC relies on production and consumption models, human interactions between workers, producers, and consumers are also cornerstones (Raworth, 2017).

While the physical system of CE has received substantial attention, studies on the socio-economic aspects remain limited (Bertassini et al., 2021; Chiappetta Jabbour et al., 2019). Research exploring the integration of CE's physical and socio-economic systems is particularly scarce in the TAVC. Practical evidence on how businesses configure and adapt their internal systems during the CE transition is also lacking. Specifically, little is known about how businesses operationalize CE's social dimensions, such as worker well-being and community impacts, within their internal systems.

Analyzing these issues in the TAVC is essential due to the sector's global significance and the increasing focus on CE by businesses and policymakers. Addressing the interplay between physical and socio-economic systems in this context can provide critical insights into creating a more inclusive and sustainable CE transition.

1.5.3 Lack of transformative narratives informing the implementation of CE

In many countries and regions, achieving a high level of circularity in the sector is an ambition set for the not-so-distant future (e.g. 2050) (Ministry of Infrastructure & Water Management, 2020; De los Rios & Charnley, 2017; Elia et al., 2017; Geissdoerfer et al., 2017; Stahel, 2016; Witjes and Lozano, 2016). However emulating current CE narratives, most conceptualizations of CE future visions also fail to address systemic inequalities, particularly regarding justice, gender equity, and power dynamics. This gap is critical because future visions shape ambitions and roadmaps for action today. Without intentional efforts to address systemic issues such as gender inequalities, lack of diverse voices, power asymmetries, and unequal socio-environmental impacts, the TAVC risks perpetuating colonial structures, exacerbating power imbalances, and reinforcing worker vulnerabilities. Therefore, transformative CE approaches are urgently needed to develop equitable and sustainable pathways for the sector.

Transformative approaches have been explored from different fields of study. They present themselves as an alternative to the status quo of business-as-usual, prioritizing co-creation, inclusion, diversity, and socially driven goals (Horcea-Milcu et al., 2024; Iwaniec et al., 2021). They offer a roadmap to rebalance social, economic, and environmental priorities in ways that challenge entrenched inequalities. Three complementary streams of research that can offer promising pathways for developing transformative CE approaches for the TAVC, which have been understudied in connection to CE are just transition (Abram et al., 2022; Schröder, 2020), gender studies, (Padilla-Rivera et al., 2021; Palm et al., 2024; Pla-Julián & Guevara, 2019); and *futureing* studies (Hoffman et al., 2021; Neuhoff et al., 2023; Oomen et al., 2022).

A Just Transition perspective

A just transition lens integrates labor and environmental justice considerations, ensuring that socio-economic and environmental impacts are addressed equally. This approach can provide a transformative perspective by integrating justice dimensions—procedural, distributive, recognition, and restorative—to address systemic socio-environmental challenges (Abram et al., 2022). While often applied in the energy sector, it has growing relevance for CE transitions (Wang & Lo., 2021). These emerging research covers various aspects, such as conceptual linkage of justice and CE (Pansera et al., 2021) justice and CE trade policy (Schröder, 2020; Schroeder et al., 2018) and workers relations in the CE transition (Fairbrother & Banks, 2024).

However, empirical research on operationalizing just CE transitions by businesses in the TAVC is sparse, (Karaosman & Marshall, 2023). And so is policy research connecting just transition and CE in the TAVC. Although the European Commission's Green Deal addresses just transitions and CE policies (Filipović et al., 2022; Sabato & Fronteddu, 2020), this is not extended to the TAVC (Mishra et al., 2021), leaving marginalized workers and non-EU regions burdened with waste and socio-ecological costs. A just transition lens ensures the inclusion of vulnerable groups, rebalancing power asymmetries and promoting equitable policies across the TAVC.

A gender equity lens

Transformative gender approaches offer critical insights for equitable CE transitions in the TAVC. The sector is highly feminized, yet gender-based vulnerabilities, such as pay gaps, discrimination, and lack of agency, are often overlooked. Transformative gender approaches address these structural inequalities by focusing on four critical aspects: i) Economic Opportunities: Addressing persistent gender pay gaps and barriers to fair employment (English, 2013); ii) Agency and Empowerment: Enhancing worker voice and collective bargaining, particularly for vulnerable populations (Kabeer, 2013); iii) Power Dynamics: Establishing participatory mechanisms with equitable representation and decision-making power (Harcourt, 2019), and; iv) Intersectionality: Recognizing that workers are not homogeneous, and that overlapping identities (e.g., gender, class, ethnicity) can exacerbate vulnerabilities (Crenshaw, 1991). Incorporating a transformative gender lens ensures the CE transition in the TAVC is inclusive and empowers marginalized workers, providing actionable insights for policymakers and businesses.

A futuring lens

Finally, futuring approaches envision alternative, transformative pathways for sustainability, moving beyond technocratic or business-as-usual scenarios

(Hoffman et al., 2021; Oomen et al., 2022). Emerging studies on the social dimension of CE futures emphasize the lack of concepts such as collaboration, diversity, and justice. For instance, Svenfelt et al., (2019) propose CE pathways rooted in collaborative economies, welfare-state principles, and local self-sufficiency. Similarly, Calisto Friant et al., (2020) highlight typologies like a Transformational Circular Society, prioritizing systemic change and inclusivity over profit-centric models. Transformative *futuring* approaches are more far reaching in studying how different futures come to be. In transformative futures agency, diversity, and co-creation are crucial to develop alternative pathways for sustainability (Hoffman et al., 2021; Iwaniec et al., 2021).

Despite their potential, transformative CE futures in the TAVC remain underexplored. Incorporating these perspectives can help shift the sector from reinforcing inequities to fostering justice and sustainability. Figure 1.1 shows the levels of CE implementation, along with the critical gaps explored in this dissertation and the different lenses used for a transformative and just circular transition in the TAVC.

To summarize, this research will explore; i) the absence of robust social assessment methods to capture CE complexities, ii) the limited evidence on the effects of circular practices on workers and communities, iii) the insufficient understanding of how systems thinking supports inclusive and Just CE transitions, and iv) the lack of effective policy frameworks to guide such transitions. Addressing these gaps is essential, because the persistent imbalance between social impact, justice, and environmental considerations in CE discussions risks perpetuating the same patterns of oppression and poverty inherent in the traditional linear TAVC.

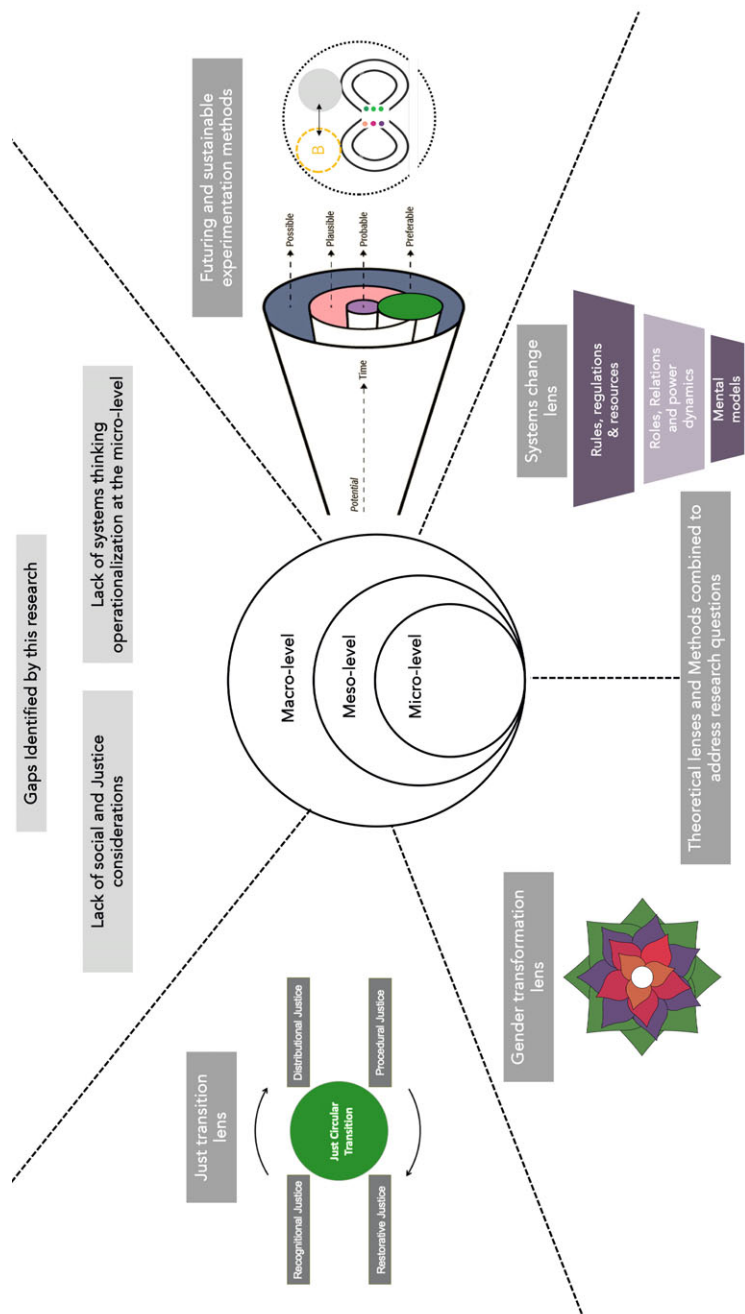


Figure 1.1 Levels of CE implementation, research gaps, lenses and methods used to address them.

1.6 Research Questions, Structure and Phases

As a transformative CE transition requires bold, inclusive approaches that confront systemic injustices and prioritize equity, this thesis melds just transition, gender, and *futuring* lenses, to respond to the following main research question (MRQ) and research questions (QR):

How can the TAVC improve the social impacts of circular practices through an inclusive and just transition CE lens?

Research questions (RQ) :

RQ1: *How can the social impacts of the Circular Economy be assessed from the workers' perspectives in the TAVC?*

RQ2: *How do circular strategies implemented by TAVC businesses in different countries affect workers in terms of job quality, well-being, and gender equality and inclusion?*

RQ3: *How could transformative circular futures inform industry and policymakers to improve the social impact for workers involved in circular strategies in the TAVC?*

RQ4: *How do Circular businesses on the TAVC implement inclusive and just circular practices through experimentation?*

RQ5: *How can EU Textile Policies enable the transition to a Just and Sustainable Circular Sector?*

By adopting a holistic approach, this dissertation aims to inspire and delineate potential avenues towards a transformative and Just CE transition in the TAVC.

Phases and thesis structure

This research followed six distinct phases, (illustrated in Figure 1.2): which guided the research structure too. *Phase one Problem conceptualization and development of research-team support systems* is covered in Chapter 1. *Phase two Measurement Design: Defining "what to measure" and "how to measure"* is covered in Chapter 2 and addresses RQ1. The *third phase Evidence Assessment: Gathering and analyzing social impact data*, is covered in Chapter 3 and addresses RQ2. The *fourth phase Envisioning: co-Developing transformative future-oriented scenarios*, is covered in Chapter 4 and focused on answering RQ3. In the *fifth phase Experimentation* the aim was to implement and test transformative interventions, to answer RQ4. which

is addressed in both Chapter 5 and Chapter 6. *The sixth phase, Amplification and Consolidation: Scaling insights and solidifying outcomes*, was covered in chapter 7 and dealt with RQ5. Here we elucidate policy recommendations for the EU and the Global South to accelerate a Just-transformative Circular Economy transition for the sector. Finally, chapter 8 addresses the general conclusions of this dissertation, a reflection on the methodology and future research.

1.7 Research approach

Sustainable development is typically framed by the three pillars of environment, economy, and society (Mensah, 2019). However, research in this domain often adopts a binary approach, focusing primarily on either environmental or social dimensions. This relationship is also asymmetrical, with a marked emphasis on environmental concerns. Most sustainability research privileges environmental aspects, while social science and its concerns are often sidelined (Lahsen & Turnhout, 2021; Overland & Sovacool, 2020; Shove & Walker, 2010). According to Muñoz-Torres et al., (2022); Nugraheni et al., (2019); and Santos et al., (2019), the social dimension is the least studied side of sustainability. Circular Economy research mirrors this asymmetrical divide as well, where the environmental perspective dominates while social considerations remain weakly integrated into both theory and practice. The divide amongst fields is reflected even in the physical organization of research spaces, contributing also to siloing research (Jacobs & Frickel, 2009; MacLeod, 2018). For instance, at our institution, environmental sciences occupy the 8th floor, while the social sciences of sustainability are on the 7th.

To challenge this entrenched separation, we draw inspiration from the concept of the “7 ½ floor,” a reference to the film *Being John Malkovich*, where an unconventional space exists between floors seven and eight (which curiously enough, fits the physical divide at our institution.) Similarly, this dissertation aims to situate itself in this metaphorical “in-between” space—where disciplines intersect, and new possibilities can emerge. The 7 ½ floor represents a physical and mental space for co-creation, deep collaboration, and cross-pollination among disciplines, as well as between academic and societal actors. This dissertation is grounded in a transformative research (TR) approach, that aims to bridge social justice and environmental dimensions. It seeks to redefine CE narratives and practices within the textile value chain, emphasizing on materials, products, their makers, and their users.

1.8 Research design & methods

If societal transformations are sought, science to enable such outcomes should also be conducted in a transformative way (Horcea-Milcu et al., 2024; Kläy et al., 2015). This research aims to create actionable knowledge that tackles systemic challenges and fosters equitable and sustainable societal change. Hence, this thesis adopts a transformative (TR) approach rooted in systems change, just transition principles, and a gender lens. It integrates inductive-deductive reasoning and employs mixed qualitative and quantitative methods. While each chapter outlines its specific methodology, all chapters adhere to the overarching logic summarized in Figure 1.2. According to (Horcea-Milcu et al., 2024), TR combines knowledge production with co-creating change, where the process of inquiry is a critical concern. It shares six main characteristics: purposeful intervention, knowledge co-production, systems thinking and change, reflexivity and values awareness, empowering local agency, rethinking impact and its assessment.

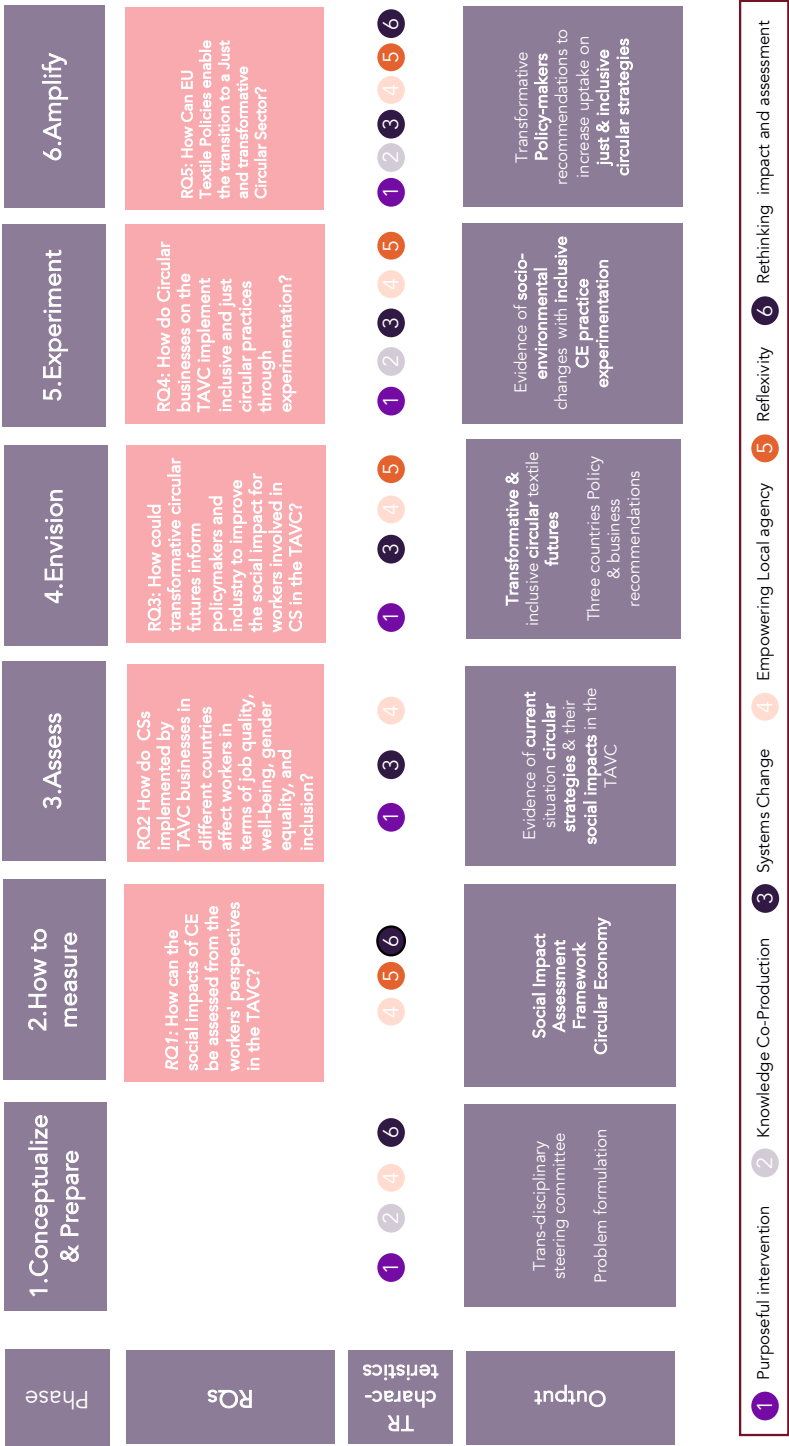


Figure 1.2. Research Phases, transformative research (TR) characteristics applied and outputs.

Characteristics of the TR approach in this thesis:

● **1. Purposeful intervention:** Transformative research is deliberately interventional, aiming to drive change toward a desirable future (Fazey et al., 2018; Schneidewind et al., 2016). This thesis embodies this through its goal of fostering a just, transformative Circular Economy (CE) and by employing co-creation methodologies like *futuring* (diverse, co-created scenarios making) in Chapter 3 and sustainability transition experiments with circular businesses in Chapter 4.

CE experimentation is highlighted as crucial for fostering organizational and cultural change by introducing new norms, values, and behaviors (Bocken et al., 2021; Weissbrod & Bocken, 2017). Complementary methods, such as worker surveys, semi-structured interviews (Chapters 2, 3, 5, and 6), and material flow analysis for environmental dimensions (Chapters 5 and 6), further supported these interventions. Tangible outcomes included policy recommendations, industry white papers, and an awareness campaign co-created with local NGOs on the theme of “who is behind circular strategies,” which was conducted online across multiple countries.

● **2. Knowledge co-production:** This research embraced co-production of knowledge, spanning problem conceptualization, research design, and implementation (Chambers et al., 2021; Lang & Wiek, 2022). The research problem itself emerged from prior collaborations with Lis, María and Anita², and took shape along the research founder institution, and was refined with research team through biweekly meetings to ensure alignment with local priorities.

Interdisciplinary advisory boards were formed in India, the Netherlands, and Spain and played a pivotal role over the four-year period. Each board, comprising 4–5 members, was carefully selected for:

- Transdisciplinary Expertise: Academics and practitioners in textiles, labor economics, entrepreneurship, business, policy, and NGOs.
- Gender Balance: Prioritizing women’s voices.
- Diverse Representation: Including established and emerging circular businesses.

The boards convened quarterly for feedback and collaboration, with annual cross-board meetings facilitating knowledge exchange. Examples of co-

2 Ashoka fellows, that with their own organizations, became country partners for the research. Maria Almazan (Smart Green Industry) and Anita Ahuja, (Conserve India)

created outputs included three coauthored academic papers, blending social and environmental sciences, three industry-targeted white papers coauthored with societal stakeholders and a collaborative artistic installation using research output from the *futuring* workshops in association with visual artists.

● **3. Use of systems change as a core framework:** In this thesis, Systems change was both an identified gap and a guiding research principle. By understanding subsystems within the TAVC, interventions targeted key leverage points at business and policy levels. All activities of research had a system-change approach. To answer RQ2 a mapping of current system was developed in the three countries, where system change characteristics were analyzed. Additionally, to answer RQ3-(Chapter 4) System change methodologies were woven on both the *futuring* scenarios, and in the business experimentation (Chapter 5) as well as in the just transition policy briefs created for the Netherlands, for Spain and for India (see annexes 7.4-7.7)

● **4. Empowering local agency:** Transformative research alternates between focusing on localized specifics for contextual insights and broader systemic patterns (Horcea-Milcu et al., 2024), aiming to empower local actors while addressing power imbalances (Temper et al., 2018; Thapa et al., 2022; Vogel & O'Brien, 2022). In this thesis, collaboration with local partners and steering committees ensured ongoing active local agency and meaningful participation. Furthermore, this research aimed at amplifying marginalized voices, emphasizing workers' perspectives, particularly those with intersecting vulnerabilities (e.g., female, migrant, youth). Workers actively contributed through:

- Data collection (Chapters 2 and 3).
- *Futuring* scenarios (Chapter 4), where workers played key roles.
- Pre- and post-experimentation assessments (Chapters 5 and 6).

● **5. Reflexivity:** Often considered a cornerstone of transformative research, it requires researchers to address the values shaping their work and influencing the process (Redman & Wiek, 2021). This thesis fostered reflexivity through several activities. First, by being situated in the 7 1/2 space, tensions between different disciplines, when developing activities or writing articles became evident, and helped nurture deeper reflections for the lead researcher and helped her to think on her positionality. Second, during futures co-creating exercises, stakeholders that often don't sit together were deliberately mixed to embrace tensions, enrich discussions and work together. Additionally, regular meetings with the different local boards also helped to shed light on different views as often local perspectives differ from each other.

● **6. Societal Impact and Alternative Metrics:** Transformative research shifts the focus of impact to societal relevance and policy influence (Horcea-Milcu et al., 2024), by for example emphasizing broader metrics such as community strengthening, social learning, trust building, etc. (Bergmann et al., 2021; Davies et al., 2021) or by increasing awareness or collective knowledge on a subject (Karcher et al., 2021; Schneider et al., 2019). This thesis aims to create societal impact by:

- Building a cross-country community of practice for knowledge sharing and collaboration.
- Engaging with educational institutions, labor unions, and local practitioners via conferences and workshops.
- Developing policy briefs and presenting them to relevant ministries and municipalities.

By integrating co-creation, systemic analysis, experimentation and stakeholder engagement, the research aims to generate valuable insights but also contribute to meaningful societal impact.

1.9 Chapters overview

Following the introduction of the dissertation's main theme in the first chapter, the remaining chapters are organized as follows:

Chapter 2 introduces the Social Impact Assessment Framework for Circular Economy (SIAF-CE \wp), addressing the gap in tools to evaluate social impacts of circular practices within the textile and apparel value chain. The chapter assesses the current state of workers' and community well-being, emphasizing inclusivity and sustainability. It aims to guide businesses and policymakers by integrating principles of solidarity and social economy alongside Circular Economy creating a foundation for equitable practices in the sector.

Chapter 3 provides empirical evidence on the social impacts of Circular Economy strategies in the TAVC across India, the Netherlands, and Spain. It highlights persistent challenges such as precarious working conditions and gender inequality, which mirror those of the linear economy. By applying the SIAF-CE \wp , the chapter evaluates social outcomes like job quality, worker well-being and gender inclusion. It stresses the urgency of stronger social ambitions in CE policies and coordinated strategies among stakeholders, laying the groundwork for a just circular transition.

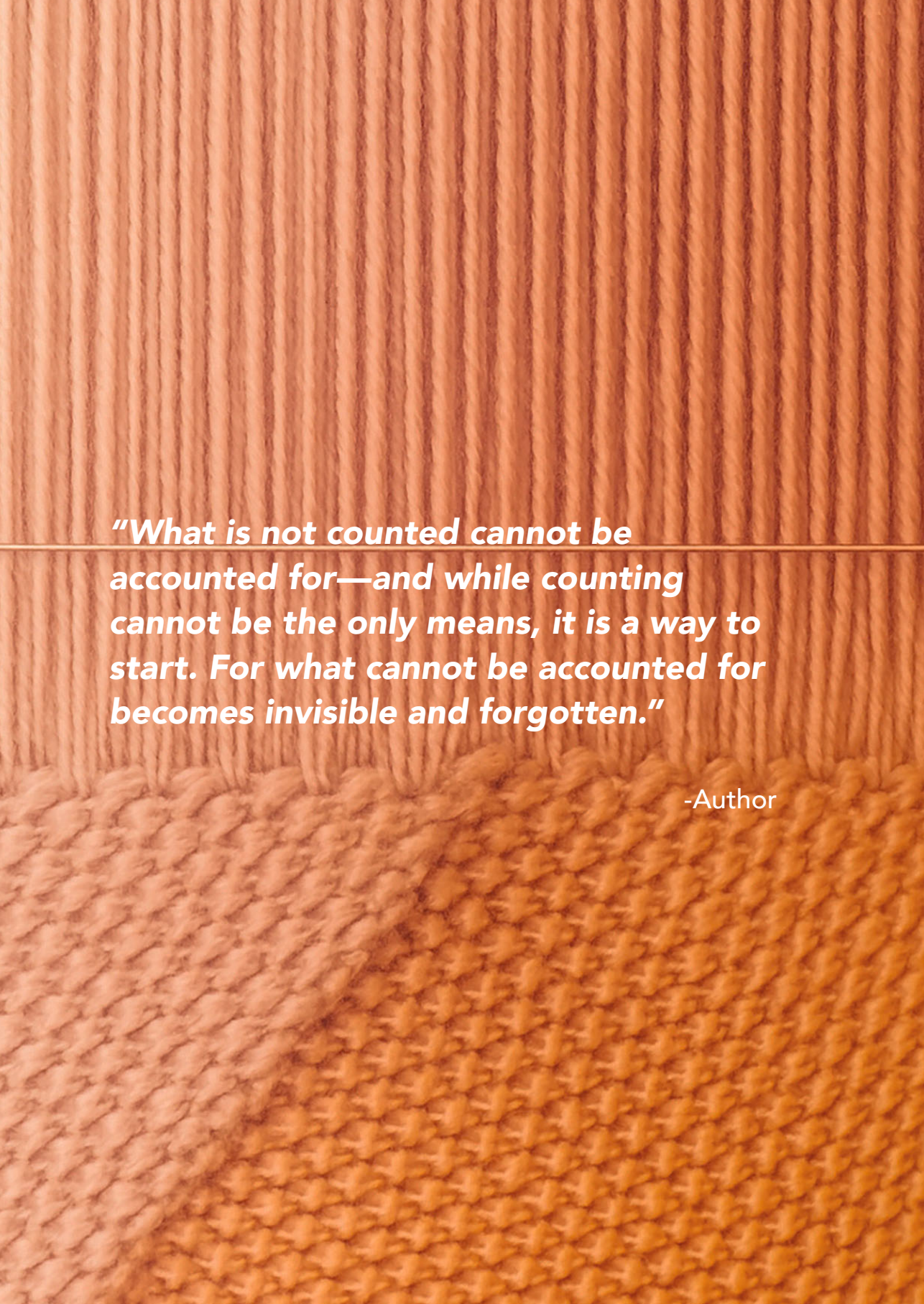
Chapter 4 develops Transformative Circular Futures to integrate social considerations into the CE framework. Using participatory methods, like

futuring and collective backcasting, 16 scenarios were co-created, focusing on system-change and equitable futures. The research proposes policy recommendations to address inequalities, improve well-being, and ensure fair wages. Key actions include challenging patriarchal norms, establishing global committees for social actors, and embedding social impact considerations into all negotiations within the textile and apparel value chain.

Chapter 5 explores CE implementation at the micro-level, examining the interaction between “soft” elements (e.g. organizational culture) and “hard” elements (e.g. material flows) through ten case studies from three countries. The findings reveal systemic challenges businesses face in aligning social and environmental goals, such as job security gaps and income disparities. The chapter proposes a transformative CE framework that integrates soft and hard elements to enhance material efficiency while addressing critical social issues.

Chapter 6 focuses on CE practices through six months of experimentation with ten SMEs in the TAVC. The study demonstrates how experimental approaches can achieve environmental benefits (e.g., waste reduction) alongside social improvements (e.g., gender pay parity, improved worker voice). However, challenges like achieving living wages and reducing informal labor remain. The chapter highlights the importance of sustained worker engagement and policy support to foster a Just CE transition.

Chapter 7 examines CE policies at the European level, critiquing the EU Green Deal’s circular textiles program from a just transition perspective. It identifies gaps in addressing overproduction, global social impacts, and the inclusion of vulnerable groups. The chapter advocates for globally accountable policies, participatory mechanisms, and comprehensive support systems for marginalized workers. By aligning environmental goals with social justice, it provides actionable recommendations for equitable CE policies in the global textile sector. This chapter also serves as the basis for a detailed just transition policy briefs for the Netherlands, Spain and India, included in annexes(7.4, 7.5 and 7.6).



"What is not counted cannot be accounted for—and while counting cannot be the only means, it is a way to start. For what cannot be accounted for becomes invisible and forgotten."

-Author

2

Assessing Through a Gender-Inclusion Lens the Social Impact of Circular Strategies in the Apparel Value Chain: The Dutch Case

This chapter is based on Suarez Visbal, L., Stuckrath, C., & Carreón, J. R. (2022). Assessing through a gender-inclusion lens the social Impact of circular strategies in the Apparel Value Chain: The Dutch case. Chapter 9 In *Social and Cultural Aspects of the Circular Economy: Toward Solidarity and Inclusivity* (pp. 136–159). *Utrecht University*.

<https://dspace.library.uu.nl/handle/1874/416584>

Abstract

This chapter focuses on the Circular Economy (CE) implementation in the textile and apparel value chain, often stigmatized by the take-make-waste model, unfair working conditions and environmental degradation. A growing number of businesses in the sector have been adopting Circular Economy as a new framework to achieve sustainability. However, currently there is a lack of knowledge to assess the social impacts generated by the adoption of circular practices by textile and apparel businesses. Therefore, this chapter investigates the current social impact of circularity in the textile and apparel sector in terms of workers, community well-being and inclusiveness. It proposes a new social impact assessment framework for CE useful for academic, business and policy makers. The social impact assessment framework is called SIAF-CE and is guided by social sustainability and CE principles.

2.1 Introduction

The textile and apparel value chain (TAVC) comprises different industries, with diverse businesses operating in several geographical locations. It employs more than 9,3% of the global working population, ensuring the livelihood of millions of workers in the extraction, manufacturing, distribution, and end of life stages of its value chain (De Souza et al., 2010; Franco, 2017; Ozturk et al., 2016; World Bank, 2012). It is associated with increasing inequalities in how clothes are made, stressing the importance of evaluating its social impacts (Fletcher & Tham., 2014; Seuring et al., 2008; Boström & Micheletti., 2016; Franco, 2017; Resta et al., 2016; Ellen MacArthur Foundation, 2017; Shen et al., 2017). At the same time, the industry is highly feminized as more than 75% of workers are women occupying the lowest-paid jobs (Fletcher & Tham., 2014), which raises crucial challenges regarding gender equality.

Businesses in the TAVC have been adopting Circular Economy as a new framework to achieve sustainability, where environmental, economic, and social considerations are integrated into the business model (Henry et al., 2020). The Circular Economy can reduce environmental impacts by minimizing resource flow and implementing different circular strategies such as Resale, Rental, Repair, Remanufacture, and Recycling (Guldmann, 2016; Stahel, 2016; Jung & Jin., 2016; Accenture, 2019). So far, the economic and environmental dimensions have been successfully addressed by different businesses such as Nudie Jeans, Patagonia, Vigga & Filippa K (Jung & Jin., 2016; Pal et al., 2016; Ellen MacArthur Foundation, 2017).

However, there is little knowledge about Circular Economy social impacts (e.g., decent pay, gender equality, labor conditions), and no known scientific framework to assess Circular Economy social impacts at the business level (Elia et al., 2017; Merli et al., 2018; Millar et al. 2019). Recent assessment methods consider mainly environmental or economic domains (Corona et al., 2019). This vision often overlooks potential impacts and trade-offs such as regulation, governance, culture, inclusivity, and marked inequalities, resulting in perspectives with incomplete information (Elia et al., 2017; Geissdoerfer et al., 2017; Iacovidou et al., 2017; Merli et al., 2018; Millar et al., 2019).

Although several considerations of social impacts exist, Circular Economy's social dimension has been defined in literature mainly by the number of jobs created (Millar et al., 2019). This definition is narrow in scope and depth as it does not define the type of job (or its quality), nor does it elaborate on potential individual and community impacts or potential trade-offs between

different kind of workers, which from a solidarity and inclusion point of view is also relevant.

Although there are numerous social impact assessment frameworks (SIAF) within the broader sustainability field and a myriad of sector-specific tools developed by NGO's and companies, these do not seem, on their own, to fully address the Circular Economy social impacts characteristics within the sector (Jijelava & Vanclay., 2014; Vanclay, 2002; Maa, n.d.). Conventional linear activities in the TAVC are characterized by i) labor intensity with low payment and low working conditions (Kane, 2015; Ascoly, 2009; Asia Floor Wage Alliance, 2016) ii) the over-representation of vulnerable populations working at various stages of the TAVC (Kate & Theuw., 2016), and iii) the feminization of the workforce (Van Nederveen Meerkerk, 2018; Fletcher & Tham., 2014). As circular strategies are being deployed in the sector, they risk adopting these low-pay low-working conditions for vulnerable workers.

Circular Economy has intrinsic characteristics that could amplify effects in the sectors where it is implemented. First, it requires tight collaboration and well-defined reverse logistics with upstream and downstream stakeholders of the TAVC to close the loops (Iacovidou, Hahladakis, & Purnell., 2020). As it presupposes the development of technical innovations, it can create, displace, or eliminate jobs at various stages of the TAVC. Thus, it is pivotal to analyze circular strategies social impacts from a systemic level (Vanclay, 2019). Second, with the implementation of these performance loops, existing low working conditions could be reinforced and create a lock-in situation (Kim, 2000). Third, sorting and separating different materials in the Recycling phase as well as preparing materials for Remanufacturing can expose workers to unknown chemicals, with undetermined health and well-being issues for them and close by communities (Ellen MacArthur Foundation, 2017; Pla-Julián & Guevara., 2019; Ingallina, 2018).

Therefore, strengthening the Circular Economy's social dimension is vital for theoretical and societal reasons. From a theoretical point of view, Circular Economy's claim as a new paradigm to achieve sustainability could be jeopardized if its social dimension is not reinforced. From a societal perspective, if Circular Economy in the apparel sector weakly addresses the social dimension, jobs created could share the same prevalent low working conditions as in the linear business model. Consequently, workers in the sector will not be better off with circularity. Their weak and vulnerable position could be exacerbated if circularity in the sector increases in the future.

This chapter addresses the lack of a Social Impact Assessment Framework for Circular Economy with a gender-inclusion lens to assess the TAVC. A gender-inclusion lens can help identify structural inequalities between men and women in socio-economic spheres and suggest a course of action to redress those inequalities.

We chose to test our proposed “*Social Impact Assessment Framework for Circular Economy with a Gender-Inclusion Lens (SIAF-CE_{GI})*” in the Dutch TAVC because the Netherlands is a frontrunner in Circular Economy policy and implementation across various sectors (Kirchherr et al., 2018; Government of Netherlands, 2016; Van Rompaey, 2019).

The remaining segments are organized as follows: Section 2 explains how social impacts are considered in the Circular Economy concept. Section 3 describes the methodology. Section 4 presents our proposed social impact assessment framework. Section 5 discusses our results and delineates the most relevant topics for further analysis. Finally, Section 6 presents our conclusions.

2.2 Social impact assessment frameworks and circular strategies

Even though there is not currently a framework to assess Circular Economy social impacts, there are several SIAFs from different scales and-or levels of aggregation that could be used for this purpose. Most sector-specific tools engage collaboratively with stakeholders to either inform consumers or work specifically on workers’ rights, capacity development and voice of workers (Casey, 2006). However, many of these frameworks are based on audits that have been highly criticized for relying on a compliance perspective (e.g., required by the brand) that leans too much on management and not so much on workers’ feedback (Barrientos & Smith., 2007).

According to Jijelava & Vanclay (2014), SIAFs should address social issues at three levels: the individual, household-community, and societal level. Other important considerations are that i) job creation is how the current social ambition of circularity is defined, ii) quality, inclusivity and community impacts are considered relevant aspects of job impacts so far unaddressed by circularity (Circle Economy, 2020; Willeghems & Bachus., 2018; Rubery, 2019) and that iii) the TAVC is highly feminized. Understanding by feminization the fact that most workers within the low-income and poor working conditions bracket are mostly women and that gender constructs such as lack of unequal access to education and family obligations prevent them from taking better opportunities and improving their livelihoods (Van Nederveen Meerkerk, 2018; Fletcher &Tham.,

2014). Given these considerations, we define three social impact dimensions that circular strategies in the TAVC, should address which are:

2.2.1 Quality of jobs dimension

Although there is no one definition of Quality of Jobs (QOJ), there is consensus that it relates to the characteristics that affect employee work-life. Usually, it includes elements such as pay, working conditions, career opportunities (Burchell et al., 2014). Several frameworks focus on the QOJ, and we highlight three: the International Labour Organization (ILO) work indicators, the United Nations Economic Commission for Europe (UNECE) and the OECD framework. The ILO decent work indicators comprise a set of 75 indicators and 21 legal frameworks. They cover ten main aspects that are summarized in Table 9.1. The ILO standard is often used as a reference point to help countries define the QOJ in a particular sector. However, because of its complexity, it is not practical for company-level applications.

The statistical framework developed by UNECE (Cazes et al., 2015) provides a set of indicators to measure employment quality with seven dimensions and twelve subdimensions. ILO and UNECE are very comprehensive and cover multiple dimensions that rely on numerous indicators of different nature, which from a business perspective is often seen as a problem as it affects the comparability and usability of these frameworks. None of them are based on normative choices about what should be considered as “good” or “bad” jobs, but rather, they guide how those indicators should be used (Cazes et al., 2015).

Finally, the OECD Framework for job quality assessment (Cazes et al., 2015) is structured around three components: earning quality, labor market security and work environment. It follows the guiding principles of the well-being agenda, as recommended in the Stiglitz Report (Stiglitz, Fitoussi, & Sen., 2009). It focuses on both the job characteristics and job quality outcomes (as experienced by workers) and not only on drivers of job quality (such as regulation and compliance) (Cazes et al., 2015). “The job characteristics approach defines the quality of the working environment in terms of several specific characteristics that influence workers’ well-being.” (OECD, 2017). This framework explicitly emphasizes workers perspectives as opposed to employers or investors.

2.2.2 Sustainable livelihood dimension

Sustainable Livelihood (SL) refer to the living standards, assets and opportunities that a household, a family or community enjoys (Cahn, 2002). Regarding community well-being, two of the most widespread community poverty alleviation and well-being frameworks are the Multidimensional Poverty Index (MPI) developed by the Oxford Poverty & Human Development Initiative

(Alkire et al., 2015) and the Sustainable Livelihood approach (DFID, 2000). The MPI consists of ten indicators of poverty, divided into three broad dimensions. The MPI combines i) the proportion of poor people and ii) the intensity, defined as the percentage of dimensions in which the poor are divided (Alkire et al., 2013; Alkire et al., 2015). The MPI is a comprehensive framework to assess poverty and community well-being at a national level. However, it does not have indicators to assess from a micro-perspective or organizational level.

The Sustainable Livelihood approach (DFID, 2000) includes a portfolio of five assets (human assets, natural assets, physical assets, financial assets, and social assets) (Krantz, 2001), out of which people construct their living. It is a flexible and straightforward framework, adaptable to various projects, and it has been widely used in both developing and developed countries. However, it has been criticized for overseeing existing power dynamics, emphasizing individuals' agency while not analyzing structural barriers in-depth (Horsley et al., 2015; Scoones, 2009).

2.2.3 Gender equality and inclusion dimension

The Gender Equality and Inclusion (GE&I) dimension is important because in assessing social impacts, there is a tendency to see 'the community as a homogeneous unit without considering different roles, positions and situations of women and men (Vanclay, 2002; Jijelava & Vanclay, 2014). Such implicit assumptions result in knowledge of social impacts based only on one perspective (Van Nederveen Meerkerk, 2018). With women and vulnerable populations disproportionately affected by adverse working conditions, it is vital to consider their perspective and the different roles regarding circular strategies implemented in the industry (Neetha, 2002; Fletcher & Tham, 2014).

There are several gender analysis tools made by academics, NGOs, and governmental agencies such as the OECD and the SIDA, The Capacities and Vulnerabilities Framework (CVA), the Equality and Empowerment Framework (Longwe), The UN Gender rapid assessment Tool, among others (Equilo, n.d.). Additionally, some Apparel sector-based organizations have integrated a more comprehensive gender equality approach. Three available tools in this area are the eight building blocks for women economic empowerment (ICRW, 2016), the Business for Social Responsibility (BSR) gender impact framework- equality guide for social auditing and the data collection tool of the Social Convergence Project (SLCP n.d.). The BSR tool and SLCP are relatively novel initiatives with little widespread use by industry practitioners and no academic analysis. However, these tools share similar indicators and focus on the same areas as the eight building blocks for women's economic empowerment.

We argue that when analyzing jobs and, in particular circular jobs in the apparel sector, applying a transformative gender-inclusion lens can help identify structural inequalities between men and women in socio-economic spheres and suggest a course of action to redress those inequalities. Transformative is understood as a way that seeks a more systemic approach. By applying a gender lens, we analyze how economic and social development is determined by power relations in different spheres of society from the family, community and working relations.

An inclusion lens highlights the blind spots where individuals with several vulnerabilities (e.g., gender, social class, ethnicity, place of origin, religion) are excluded from development processes. Social exclusion and inclusion are critical aspects of the social and economic policy agenda. According to Labonté and Hadi (2011,3), “although there is much disagreement among authors on what the concepts of social exclusion/inclusion mean, there is emergent consensus that they imply that (households and their members) have access to material resources, to labor markets, education and healthcare, have freedom from discrimination, opportunities for social participation, and voice around the policy choices affecting all of these conditions.”

In this sense, a transformative gender-inclusion lens should tackle four essential considerations: i) type of jobs and economic opportunity (English, 2013; Van Nederveen Meerkerk, 2018), ii) access to non-economic factors such as agency, empowerment and autonomy (Kabeer, 2013; Kabeer & Mahmud, 2004), iii) intersectionality: defined as the interaction between race, class, and gender (Crenshaw, 1991; Weldon, 2006), and iv) existing power dynamics influencing social and job market discrimination rooted in existing socio-cultural structures (English, 2013). This way, a gender-inclusion lens can provide valuable insight to inform targeted businesses and policymaking recommendations (Harcourt, 2019; Weldon, 2006).

2.3 Methods

With the considerations mentioned above and based on these three dimensions explained, we built the SIAF-CE♀. We used a mixed-methods approach explained in seven steps based on Bell & Morse (2008) ‘*imagine strategy*’ to develop sustainability indicators and frameworks.

Step 1 – Contextualization (data collection I)

Through desk research and semi-structured interviews, we gather the social impacts and social impact assessment considerations relevant to the TAVC. Our sample consisted of two groups: direct businesses implementing circular

strategies and indirect ecosystem stakeholders (i.e., think tanks, academics, policymakers, NGOs, and workers' rights organizations). We created two different sets of interviews, one for each group. Businesses interviews were used to validate the potential social impacts of circularity and their social impact assessment considerations. Indirect stakeholders' interviews were set up to corroborate the context of the circular strategies. Using a snowball sampling method, we interviewed 25 businesses and five indirect stakeholders. All interviews were recorded, transcribed, and coded thematically. Given that interviews were anonymous, a code was given to each stakeholder.

Step 2 – Creation and application of boundary criteria

As existing frameworks and indicators are both a benchmark and comparison to national and international standards, we privilege this approach to create our boundary criteria (Buys, Miller & Summerville, 2007). We reviewed 203 documents (143 scientific articles, 5 theses, and 55 governmental, NGO and independent think tank reports). Keywords such as: "social impact & circularity", "circular strategies in the apparel industry", "social impact of circular strategies", and "social impacts indicators in the apparel value chain" were used. Following this logic, we identified 40 SIAFs from existing literature and interviews, and we reviewed them according to the following criteria:

Cr1: It applies to the apparel sector.

Cr2: It is used by both practitioners and academics in the field.

Cr3: It has been used in developed and developing countries.

Cr4: It covers at least one of the three identified social dimensions of circular strategy (QOJ, SL, GE&I).

Step 3 – Creation and application of practicality criteria

Practical issues are one of the main reasons a SIAF fails to be applied by businesses (Kendall & Knapp, 2000; Barman, 2007; Nicholls, 2009). Therefore, based on our content analysis (Step 1) and considering Mahmoudi et al., (2013), Veleva & Ellenbecker (2001), and Miller et al., (2007), we constructed a set of practical criteria that were applied to the SIAF's identified after the step 2. The practicality criteria are:

Cr5: It is flexible, adaptable, and business-friendly.

Cr6: It is comparable among different countries, types of businesses and circular strategies.

Cr7: It considers workers perspectives and the specific gender and workers aspects of circular strategies in the TAVC (highly feminized and heavy employment of vulnerable populations with precarious working conditions).

Step 4 – Final selection of SIAFs

To the remaining frameworks after step 3, we performed a strength and weaknesses analysis to decide which frameworks were the most suitable for assessing the social impacts of circular strategies in the TAVC. Three frameworks and eight building blocks were combined into the SIAF-CE \varnothing to reduce the individual framework's shortcomings identified through our desk research.

Step 5 – Operationalization

To operationalize the SIAF-CE \varnothing , we defined dimensions, categories and indicators for each concept included in the SIAF-CE \varnothing . We also determined questions and scores for each indicator. However, when existing frameworks included questions associated with each indicator, those questions were taken and adapted to fit our research constraints when needed. (Set of corresponding SIAF-CE \varnothing questionnaire available in annex 2.1).

We normalized the selected frameworks to the same scale and score system. A worker's survey with 5 open-ended questions and 85 closed-end questions was developed based on this information. This survey was the main tool to collect data, along with semi-structured interviews. All preselected frameworks suggested Likert scale and Likert-type scale questions with varying points from 4 to 7. We defined a 4-point Likert scale (to avoid a neutral answer).

Composite indicators were calculated for each answer using the average of the values. If the result was not an integer number, it was normalized by approximating the closest integer. In this way, we converted the values into the same qualitative scale.

Step 6 – Framework validation

The proposed SIAF-CE \varnothing was validated with the 3S-Methodology, from Cloquell-Ballester et al., (2006). Following this method, conceptual coherence, operational coherence and utility of indicators and framework were validated first by the researcher, second by academia and experts and third by practitioners (businesses managers). "Conceptual coherence defines the correct relation between the measuring instrument (indicator/framework) and the measuring object (environmental/social quality). Operational coherence determines the correct definition of the measuring instrument's internal operations (indicator/framework). Last, utility determines the applicability of the indicators/framework in environmental and social assessment studies" (Cloquell- Ballester et al., 2006). Conceptual coherence was validated using the extent to which a dimension/category/indicator assesses a relevant part of circular strategies in the TAVC. Operational coherence and utility were

validated using both the extent to which a dimension/category/indicator applies to companies and data availability. The validation was based on surveys sent to 9 validators and the relative level of consensus using a 4-point Likert scale, where 1 was little (relevance/applicability/availability), and 4 was very relevant.

Step 7 – Testing of the SIAF-CE² (data collection II)

The Dutch TAVC was used as a case to test our SIAF-CE². The target population for our surveys consisted of male and female workers from Dutch businesses in the TAVC currently adopting circular strategies. The sampling method was clustering, and 60 workers surveys were conducted. Surveys were confidential in-person and due to COVID-19 measures also via online meetings. The open-ended questions of the surveys were analyzed following a thematic coding to set up the context as explained in Step 1. The closed-ended questions were analyzed employing a 4-point Likert scale using descriptive statistics (i.e., mean, standard deviation, mode, and frequency). Workers surveys were tested on reliability through Cronbach's alpha analysis.

2.4 Results and discussion

2.4.1 Relevant social impacts and social impact assessment considerations for circularity

Based on our desk research and corroborated with the interviews, in general, social impacts present in the TAVC should also be considered in circular strategies, including at least safety and health, living wages, gender equality, excess overtime, and voice & agency. According to (EXP2): *“Even though we have been talking and doing sustainability in apparel for almost 20 years, most of these issues are still not solved. So, in this transition to circularity, many of those social impacts will continue to be an issue.”*

Even though 82% of interviewees acknowledged the importance of the social dimension on their business, only 53% measured it, showing the need for more accessible and practical assessment mechanisms that can be used at various stages of the TAVC. There is also the need to make the social impact ambition of Circular Economy more explicit from the business and policy-makers perspective.

Four reasons explain why businesses have a low social impact assessment. First, there is an asymmetry in how the industry values social impacts and environmental impacts (Norman & MacDonald, 2004). Companies tend to see environmental impacts as a cost-saving strategy. In contrast, they see social impact as a cost. As (GOV1) expressed: *“When companies prioritize risk, they*

have a due-diligence process in mind, which generally has a higher focus on environmental measures, and some are seeing Circular Economy as a way to reduce some of those risks.” Second, social impacts are perceived as harder to assess than environmental impacts (Kendall & Knapp, 2000; Barman, 2007; Nicholls, 2009), which was echoed by several interviewed businesses. Third, there is skepticism in the field around assessment tools and their effectiveness (Barrientos & Smith 2007), as confirmed by many enterprises interviewed. As put by (NGO2): *“Social impacts are measured by what you want to avoid (the base of current social audits). To be transformative, we also need to include what you want to see happening.”* The fourth reason is that there is no current framework to analyze circularity’s social impacts. This lack of a proper framework to assess social impacts keeps relevant aspects hidden (Saidani et al., 2019; Millar et al., 2019; Murray et al., 2017). As (S-CS1) indicated: *“I have not seen a particularly universal framework around social impact measuring in the Circular Economy.”*

2.4.2 Chosen frameworks to assess social impacts of the Circular Economy

After applying our boundary criteria, a total of 13 assessment tools were selected for further review. Table 2.1 summarizes the different SIAFs reviewed and the social aspects that these frameworks addressed.

Table 2.2 illustrates the evaluation of the selected frameworks after applying the practicality criteria. Columns C1 to C7 show the fulfilment (●) of a criterion for a specific framework. Only the frameworks that fulfilled all seven criteria were kept and underwent a subsequent strength and weakness analysis. The OECD quality of job framework (Cazes et al., 2015), The SL framework (DFID, 2000), the eight building blocks for women’s economic empowerment (ICRW, 2016) and the Gender Equality in Social Auditing Guidance (BSR 2019) were chosen to fulfil our proposed three-dimensional SIAF-CE_q. The OECD quality of job framework (Cazes et al., 2015) was chosen because it provides historical and geographical data from developed and developing nations, facilitating comparisons. It also defines job quality from the workers’ well-being perspective. The SL (DFID, 2000) was chosen because it is adaptable to assess individuals, households, and community levels. The eight building blocks for women’s economic empowerment (ICRW, 2016) was chosen because it highlights essential areas to address when analyzing gender equality and inclusion in a paid-work context. We also chose the BSR Gender Equality in Social Auditing Guidance (BSR, 2019) as it incorporates notions of intersectionality and socio-cultural context. It also has been tested by more than 30 global companies.

Table 2.1 Different aspects covered for the social impact assessment frameworks reviewed.

Level of aggregation	Aspects covered			
Crossed sector	Social Life Cycle Assessment (S-LCA)	●	●	●
	Social Impact Assessment (SIA)	●	●	●
	Business Social Compliance Initiative BSCI	●	●	●
	Harassment or abuse	●	●	●
	Compensation & benefits	●	●	●
	Living wages	●	●	●
	Overtime work	●	●	●
	Free choice work	●	●	●
	Health & safety	●	●	●
	Social security	●	●	●
	Skills training	●	●	●
	Freedom of association & collective bargaining	●	●	●
	Employment relations	●	●	●
	Safe working conditions	●	●	●
	Gender relations	●	●	●
	Quality of life	●	●	●
	Family & community impacts	●	●	●
	Forced labour	●	●	●
	Child labour	●	●	●
	Discrimination	●	●	●
	Cultural & community rights	●	●	●
	Environment	●	●	●
	Customs	●	●	●
	Ethical business behaviour	●	●	●
	Privacy & transparency	●	●	●

[illegible]

Table 2.2 Selection process of the social impact assessment frameworks chosen including the fulfilment of criteria (Cr) and strength and weakness analysis.

Social impact assessment framework	Cr 1	Cr 2	Cr 3	Cr 4	Cr 5	Cr 6	Cr 7	Strengths	Weaknesses	Final selection
Waste and Resources Action Program (WRAP)	●	●		●						
Fair Wear Foundation (FWF)	●	●		●						
Fair Labour Association (FLA)	●	●		●						
Ethical Trade Initiative (ETI)	●	●		●						
Social Life Cycle Assessment (S-LCA)	●	●		●						
Social Impact Assessment (SIA)			●							
United Nations Economic Commission for Europe (UNECE)	●	●	●	●		●				
International Labour Organization (ILO)	●	●	●	●						
Multidimensional Poverty Index (MPI)	●	●	●							
Sustainable Livelihood (SL)	●	●	●	●		●	●	Adaptable individual household, community	Not deep structural barrier	●
Organization for Economic Co-operation and Development (OECD)	●	●	●	●		●	●	workers focus, comparable, global, accessible	Not gender focused	●
Gender Equality in Social Auditing guidance (BSR)	●	●	●	●		●	●	Strong gender base targeted to field complexities	Need a more complex power analysis	●

Table 2.2 Selection process of the social impact assessment frameworks chosen including the fulfilment of criteria (Cr) and strength and weakness analysis. - *continued*.

Social impact assessment framework	Cr 1	Cr 2	Cr 3	Cr 4	Cr 5	Cr 6	Cr 7	Strengths	Weaknesses	Final selection
Eight Building Blocks from the International Center for Research on Women (ICRW)	●	●	●	●		●		Set of must gender equality principles, business friendly	Not a framework just set of principles	●

CRITERION USED**Cr1:** Applies to the TAVC**Cr5:** Flexible, adaptable and business-friendly**Cr2:** Used by practitioners and academics**Cr6:** Comparable among different geographies, types of businesses and circular strategies**Cr3:** Implemented in both developed and developing countries**Cr7:** Considers workers perspective and the specific gender and workers characteristics of circular strategies in the TAVC**Cr4:** Covers at least one of social impacts (QOJ, SL or GE&I)**2.4.3 Operationalization of the SIAF-CE⁷**

Following Miller et al., (2007), the final SIAF-CE⁷ was constructed by combining and adapting a selected set of four existing frameworks and building blocks. As a result, the SIAF-CE⁷ has three dimensions, QOJ, SL and GE&I. It comprises 15 composite, multi-attribute, qualitative indicators (Table 2.3). It uses 90 question worker's surveys, divided into four sections to assess each dimension and the socio-demographic context. A 4-point Likert scale is used to score indicators for each dimension. The qualitative scale adopted was (1) LOW, (2) MEDIUM-LOW, (3) MEDIUM-HIGH and (4) HIGH. Results of surveys are plotted on an excel database with their average for each indicator.

The QOJ dimension is based on 16 questions from the OECD framework to assess job quality. In the OECD QOJ framework, we adapted the Earning Quality indicator from gross hourly wage in purchasing power parity (PPP) to real monthly gross salary. This adaptation was made to reflect better the context of the TAVC, where work schedules tend to favor part-time work (ETUI, 2012), contributing to precarious working conditions. Additionally, to facilitate comparability among countries, the gross salary was transformed into the 4-point Likert scale adjusted as follow: below or equal to the poverty line (LOW=1), between the poverty line and minimum wage (MEDIUM-LOW=2),

between minimum wage and living wage (MEDIUM-HIGH=3) and above living wage and average salary on the sector (HIGH=4). Wages were converted into Euros PPP and compared using living wages data. Also, given that distribution of sector-specific earning indicator data on a national level was not available, this indicator was not used. The other 2 indicators of job security and work environment were kept as proposed by the OECD framework. The SL dimension has five composite indicators that represent each of the five assets of sustainable livelihoods. It was constructed based on 18 attributes from the UNDP SL sustainable development guide (UNDP, 2017). The GE&I dimension is composed of seven indicators. For this dimension, 9 attributes were developed with the BSR Gender Equality Social Auditing Guidance (Barraja, 2019) along with the eight building blocks and our literature review.

A flower allegory is used to illustrate the framework (Figure 2.1). Each of the three social dimensions is characterized by a layer of petals, representing an indicator for that dimension. The QOJ dimension comprises three indicators, represented by the most central layer of petals, and provides an individual perspective on job characteristics. The SL dimension assesses workers' household and community well-being through sustainable livelihoods. Five petals-indicators represent it. The outer seven petals layer represents the GE&I dimension, which assesses gender equality and inclusion within the context of the job, the family, and the societal level. The Outer layer represents the socio-cultural context and the power dynamics that need to be analyzed within.

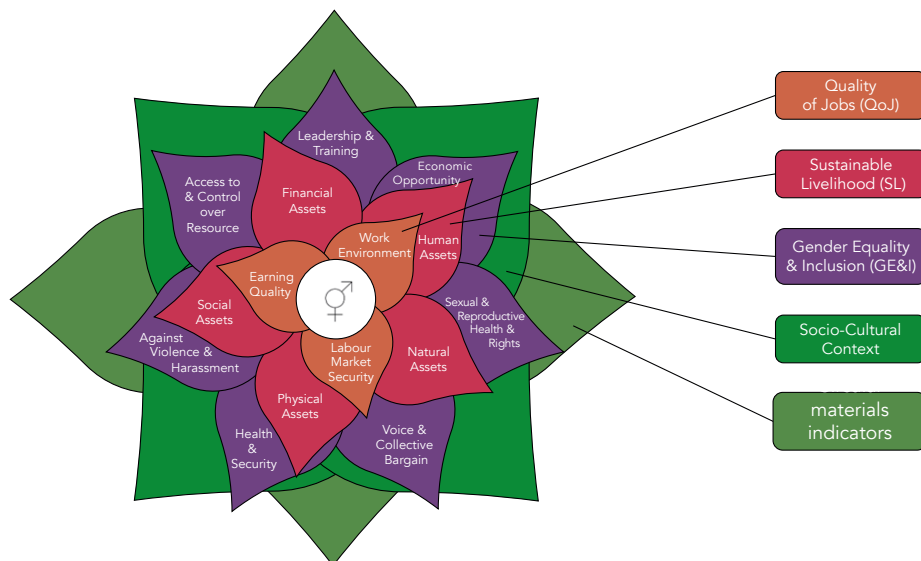


Figure 2.1 The flower SIAF-CEQ model. Each layer of petals represents one social dimension, and each petal represents an indicator. Outside layers represent socio-cultural context and power dynamics.

Table 2.3 The attributes and description of the SIAF-CEq[†] indicators.

Dimensions	Indicators	Attributes	Description
Quality of Jobs (QOJ)	Earning Quality	Gross income per month	Gross income per month, calculated at exact hours work
		Distribution of earnings with all workers (earning inequality)	N/A
	Labour Market Security	Risk of unemployment (risk and expected duration)	Perceived risk of losing the job because of contract or conditions
		Unemployment insurance (the coverage of the benefits and their generosity)	Perceived access to social welfare if employment is lost
	Work Environment	Time pressure at work	Job demands for working under stress, at high speed or tight deadlines
		Physical health factors	Exposure to chemicals, or tiring working positions and perceived level of support from colleagues
		Autonomy and learning opportunities	Skill training opportunities, opportunities for promotion or career advancement
		Workplace relationship	Perception of relationships with colleagues and supervisors and value of work
		Working very long hours	Exposure to unusual working schedules and flexibility at work

Table 2.3 The attributes and description of the SIAF-CEq indicators. - continued.

Dimensions	Indicators	Attributes	Description
Sustainable Livelihood (SL)	Human Assets	Level of perceived health	Perception of health level
		Ability to work and retained work	incidence of unemployment in the last two years
		Level of education and or skills training of household members	The highest level of education obtained
	Natural Assets	Access to natural Resources	Access and use of land, forest, water and clean air
		Environmental Quality	Access to good waste and recycling services
			Perceived level of cleanness and maintenance of community surrounding
	Physical Assets	Access to good housing	Access to basic amenities in the household
		Access to transportation services and proximity of food sources	Access to public transportation
		Access to child/elderly care or recreation facilities	Access to childcare facilities or services
			Access to recreational facilities and playgrounds
	Social Assets	Support from family and friends	Access to quality family time
			Perceived closeness with neighborhood and community
		Participation in community life	Use of programs offered in the community.
			Member of community or environmental or political group
	Financial Assets	Income/savings	Capacity to pay all monthly expenses at ease
		Money management (debts)	Capacity to save monthly
			Level of debts (incapacity to save)
		Possession of goods	Ownership of assets on a household level

Gender Equality & Inclusion (GE&I)	Economic Opportunity	Access to equitable, safe and reliable employment	Perception of women having equal access to job opportunities, internal promotion and salary than men
	Access to & Control over Resource	Access to resource Control over resources	Access to economic and financial assets Control and decision over own earnings
	Leadership & Training	Access to training & development of leadership skills	Perception of women having equal access to training and leadership opportunities promoted by management
	Voice & Collective Bargain	Voice & Collective bargain	Level of participation in Unions or workers committee
	Violence & Harassment	Procedure knowledge	Awareness of policy and procedure for addressing violence and harassment in the workplace
		Risk of Violence	Perceived level of safety in the different physical spaces of workplace
		Norms & Culture	Level of acceptance of victims of violence and harassment
	Health & Security	Access to healthcare Risk of accidents	Access to health systems and protective gear Prevention and treatment of accidents and injuries
	Sexual & Reproductive Health & Rights	Sexual & Reproductive Health & Rights	Sharing responsibility for childcare and housework

2.4.4 Validation of the SIAF-CEQ

All three dimensions were validated according to the 3S method (see section 2.3 step 6). According to the validators, the three dimensions were considered relevant and applicable to the context of circularity within the Dutch TAVC. In terms of data availability, only two indicators were thought to be easily available with a score above 80% (Earning Quality and Health & Safety), while five other indicators scored just over 50% making them potentially available. Indicators within the SL dimension showed the lowest availability score below 50% (Human Assets, Personal Assets and Social Assets), which indicates that availability for these indicators is low. From the GE&I indicators, Freedom from Violence and Freedom of Movement also have a low availability score.

Anticipating this hard-to-get data issue, we designed both our framework's questionnaire and interview setting in such a way to make workers feel safer to talk, improving our data availability. This design included four elements: i) pre-testing questions with similar workers iterative in each location until hard questions were adequately addressed by tone, intensity or language used, ii) conduct surveys in their chosen language, by gender-sensitivity trained staff, iii) adapting to interviewees availability (nights, weekends, online- personal way), and iv) including company-management in the process (especially human resources and corporate social management) and highlight the virtues of having an in-house social-impact assessment tool.

2.4.5 The SIAF-CEQ visual representation

To facilitate comparison and communication of the results, we created a visual representation that consists of a circular bar chart showing the value of the indicators from (1) LOW (no bar) to (4) HIGH (outer limit) (Figure 2.2). The graph is divided equally into three areas to plot the indicators of each dimension (QOJ, SL, and GE&I). Each of these areas contains its corresponding indicators. Each of the indicators is shown with two bars, one bar for females and another for male workers.

The value illustrated for each indicator corresponds to the average without normalization into the qualitative scale. It is a standard good practice that helps visualize and compare results, but it requires more interpretation on the user's part (Wilson et al., 2015).

2.4.6 Social implications of circular strategies in the Dutch context

To test the framework, the SIAF-CEQ was applied to the Dutch sector. According to our interviewees, the transition to circularity in the Dutch TAVC is happening organically amid a stagnating economic context in the "end-of-life" textile subsector. Thus, creating additional jobs is not seen as an immediate

priority. According to (I-TC1): *"The global used textile market is compressing, and the quality of textile collected decreases. Additionally, according to (EXP1): "In the Netherlands, most of the jobs related to circular strategies gravitate around subsidized companies whose main mission is to employ populations that are at-a-distance from the job market (including immigrants, refugees and other vulnerable groups)." This (particularly) seems to be the case for the local Remanufacturing, Resale, and Recycling (collecting, sorting, and recycling) strategies. In companies where these strategies are implemented, workers often earn the minimum wage.*

Our findings from the desk research and interviews show that, even within the traditional TAVC in the Netherlands, the retail sector employs most people (Papú Carrone et al., 2021), circular strategies such as Repair, Resale and Rental seem to create few quality jobs. As said by (NLS07), *"Repair is an extension of the customer service experience"*, and they are not a principal income-generating activity. These strategies tend to be considered tasks of current sales staff, creating jobs shifts rather than new jobs. Only new startups Rental and Resale platforms, for which these circular strategies are core business, can potentially generate jobs. However, in the current state of development, they rely heavily on volunteer jobs. Additionally, as validated by our workers' surveys, circular strategies in the sector are characterized by a predominance of temporary contracts and part-time- work schemes, which is no different from general conditions in the retail sector in the Netherlands.

Figure 2.2a. shows the social impact in the Dutch TAVC with the SIAF-CE⁹ presented in the radar bar chart visual. The chart is divided into three sections to show each of the dimensions, and within each dimension are graphed the results of each indicator disaggregated by male and female workers. Figure 2.2b. shows a layer disaggregated by each circular strategy. This visual representation gives a snapshot view of circular strategies' social impact in the TAVC using a gender-inclusion lens. Different layers could be added to show disaggregated data to allow a deeper analysis.

In general, the results show that women have lower positive social impacts than men (score lower than men). For instance, while the Quality of Job indicators is valued in the MEDIUM-HIGH scale for men, it is MEDIUM-LOW for women workers, as they are the primary earners of minimum wage. Even though the Dutch minimum wage is considered by some a living wage, given that the Netherlands has a comprehensive social security system, the wage is still in the lower spectrum in the sector. More so, it seems that within different circular strategies, women are also being disproportionally represented in this wage bracket, as in the traditional TAVC, while they are also the holders of most

part-time jobs (Fabo & Belli, 2017). However, altogether the QOJ indicators combined with labor security and work environment is MEDIUM-HIGH. Further research should investigate comparisons among different geographies with different social security schemes.

When assessing each individual circular strategy, we can see contrasting realities between them, in particular regarding the QOJ indicators (earning quality and the GE&I indicators). The earning indicator is the lowest for Rental startup workers and highest in the sorting recycling center. Voice & Collective Bargain are also very different in Rental (the lowest) and Resale (the highest), which can be attributed to the different types of enterprise and the state of consolidation of these businesses. It should be the subject of further research.

In the SL dimension, the social assets are the lowest indicator related to the social network, family and neighborhood related relations. Respondents' results show little connection with the neighborhood or their immediate community. These elements relate to inclusion and should be looked deeper into in future research. Financial assets are also low and lower for women, which means they have little capacity to save as their income is just enough to live. Many make minimum wage or just over, which is also a characteristic of the feminization trajectory of the linear TAVC.

Finally, concerning the GE&I dimension, women perceive that they have lower access to economic opportunities, promotion, leadership, and training opportunities than men, but equal control of economic resources as men. Men, however, do not perceive any difference between themselves and women in this regard, which might point to a lack of awareness of inequality issues in corporate settings, also, for circular strategies. Regarding violence and harassment, it seems that male and female workers do not consider this indicator an issue. However, as seen in (Figure 2.2b.), workers have contrasting perceptions among different circular strategies around this indicator. This outcome could also point to the difficulty of discussing violence and harassment openly. Future research should further elaborate into understanding how present these issues are within circular strategies.

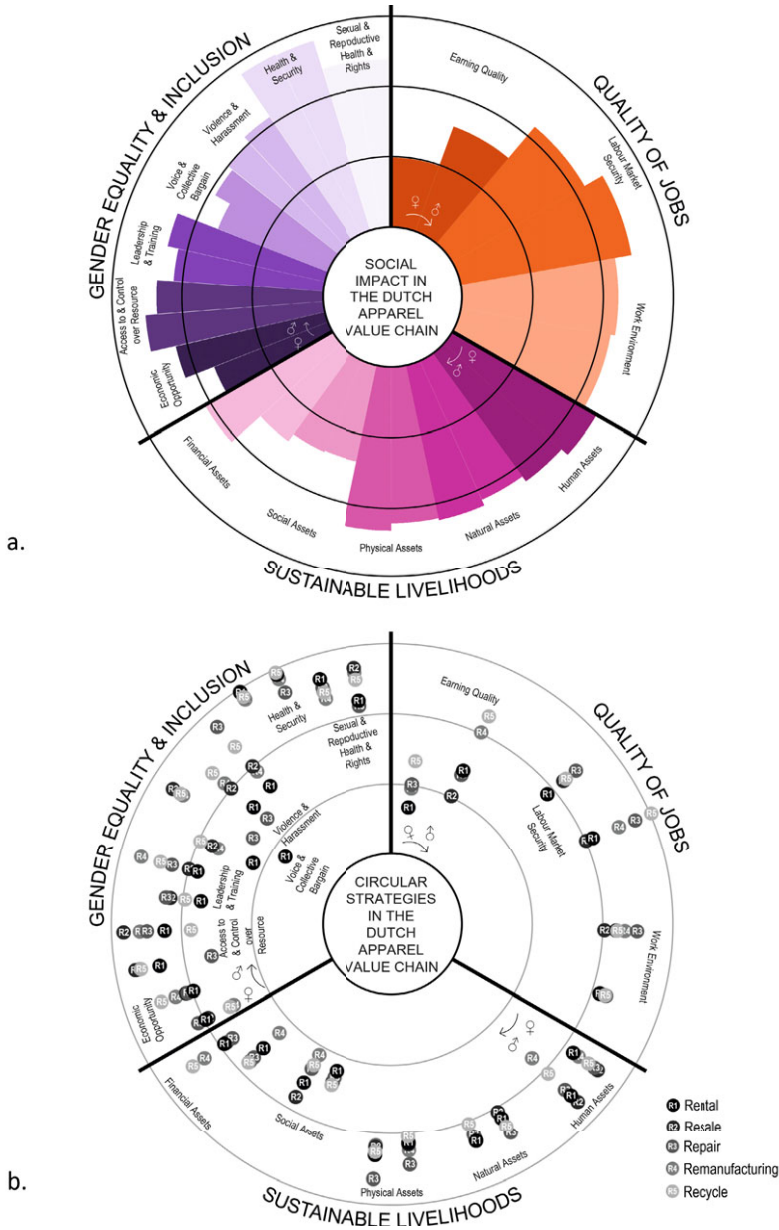


Figure 2.2a. Visual bar chart representation of the social impact of circular strategies in the Dutch apparel value chain by gender; **b.** Visual bar chart representation disaggregated for each circular strategy, represented by a specific R-number.

2.5 Conclusion

This chapter addressed the lack of a framework for social impact assessment for the Circular Economy in the apparel value chain while showing its application in the Dutch context. We propose an assessment framework called “*The Social Impact Assessment Framework for Circular Economy with a Gender-Inclusion Lens (SIAF-CE $\text{\textcircled{f}}$)*” in the TAVC.

Our results in the Dutch case indicate that local circular strategies show evidence of a differential in the impact on male and female workers, with positive but mitigated Quality of Jobs, Sustainable livelihood, and Gender Equality & Inclusion. Applying a gender-inclusion lens, gives a more detailed perspective on how different workers are affected and helps to avoid reproducing existent patterns within a TAVC that adopts circular strategies.

When comparing our SIAF-CE $\text{\textcircled{f}}$ results with our literature review and interviews around working conditions in the TAVC, our findings suggest that circularity in the Dutch TAVC is currently not transformational as it seems to emulate the low working conditions and patterns of the linear model in the sector. At this moment, workers in the sector are not necessarily better off with circularity as the feminization trajectory found in the traditional TAVC persists even when circular strategies are adopted.

The proposed (SIAF-CE $\text{\textcircled{f}}$) has several advantages, first by combining existing tools and frameworks, we address the shortcomings identified in the literature of these tools individually. Second, our framework provides gender-disaggregated data highlighting the worker’s perspective and the impact that jobs can have on their well-being and that of their family. Third, it is made to be used in multiple locations and provides an aggregated result for each circular strategy or by country or by company.

Lastly, SIAF-CE $\text{\textcircled{f}}$ provides a multidimensional view of social impacts relevant to the TAVC. It also provides a tool and a baseline to track the social impacts of circular strategies as they are being implemented. This approach can minimize potential trade-offs while offering businesses and policymakers a complete picture when assessing Circular Economy employment conditions’ gendered socio-economic effects at the business level. This is pivotal to strengthening the take-up of Circular strategies as an alternative to the take-make-dispose model. This SIAF-CE $\text{\textcircled{f}}$ could be relevant to other sectors that share similar characteristics of feminization, labor intensity and multiple locations as the TAVC.

"We have de-humanized the human side of sustainability. We've commodified it as just another input in a process. The lives of the people who make our clothes—their surroundings, their expectations—are obscure to us. We want things made well, made fast, and with no excuses."

—Interviewee, Chapter 3

3

The Social Impacts of Circular Strategies in the Apparel Value Chain; a Comparative Study Between Three Countries

This chapter is based on Suarez-Visbal, L.J., Carreón, J.R., Corona, B. et al. (2022). The Social Impacts of Circular Strategies in the Apparel Value Chain; a Comparative Study Between Three Countries. *Circ.Econ.Sust.*

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Abstract

The apparel value chain is essential for the livelihood of millions of workers around the globe. However, human rights violations, and the lack of a sustained income by apparel workers demonstrate the poor working conditions present in this sector. Circular Economy (CE) has been used by incumbent businesses and startups as a framework to achieve sustainability, thus contributing to its economic, environmental, and social dimensions. However, there is a lack of knowledge on its social impact. Most of the literature assesses CE's social impacts by focusing only on the number of jobs created. However, the majority of studies agree on the need to analyze further the quality and inclusivity aspects.

This chapter explores the social impact of the different circular strategies implemented in three countries. It assesses social impacts related to the quality of jobs, workers sustainable livelihood and gender equality and inclusion. Results corroborate that CE social ambition is low; that current circular strategies follow the same feminization and precariousness of working conditions found in the linear apparel value chain. Thus, policymakers and businesses alike need to strengthen their CE social ambition, coordinate policy and strategies with different countries stakeholders of the Apparel Value Chain to minimize trade-offs and safeguard a just circular transition. This research contributes to the body of literature on CE by introducing a social impact assessment framework for circularity called SIAF-CE⁹. Additionally, it provides evidence on the current CE social impact implemented by startups and incumbents in regional and global contexts.

Keywords: Circular Economy, Social impact, Circular Fashion, Circular Strategies, Circular textiles

3.1 Introduction

The textile and apparel value chain (TAVC) is essential for the livelihood of millions of workers in several (developing) countries, employing more than 9% of the global working population (World Bank, 2012). Human rights violations, tragedies like the Rana Plaza in Bangladesh (Fletcher & Tham, 2014; Seuring et al., 2008) and the lack of a sustained income by apparel workers (e.g. during the COVID-19 pandemic) demonstrated the poor working conditions present in this sector. This has also revealed the increasing inequality of social schemes between different regions (Anner, 2020; Notten, 2020). Additionally, the apparel sector is considered one of the most polluting ones (Ellen MacArthur Foundation, 2017; Fletcher & Tham, 2014; Shen et al., 2017). Circular Economy (CE) has been used by incumbent businesses and startups in the industry as a new framework to achieve sustainability, thus contributing to its economic, environmental, and social dimensions (Henry et al., 2020; Kirchherr et al., 2017). However, there is a lack of knowledge on the social benefits that the CE can provide (Millar et al., 2019; Murray et al., 2017; Pla-Julián & Guevara, 2019; Schroeder et al., 2019).

Most of the literature assesses CE's social impacts by focusing on the number of jobs created (Llorente-González & Vence, 2020; Millar et al., 2019; Murray et al., 2017; Pla-Julián & Guevara, 2019). These jobs are developed through different circular strategies (CSs) such as the use of recovered material, Rental, Repair, Resale, Remanufacturing, and recycling. Even though there is evidence of potential job generation through these CSs, most studies agree on the need to analyze their quality further, the impact on the community, gender equality and inclusion to redress possible harmful effects and trade-offs (Cambridge Econometrics et al., 2018; Dufourmont et al., 2019; Dufourmont & Goodwin Brown, 2020; Mitchell, 2015; Rubery, 2019; Willeghems & Bachus, 2018).

As CE close performing loops by connecting downstream and upstream stakeholders of the TAVC, it can also create a lock-in situation where working conditions become hard to change (Lacovidou et al., 2020; Kim, 2000). Additionally, given the high level of toxic chemicals used in the production, disposal and recovery of textile waste, the implementation of CSs poses specific challenges related to the well-being and health of workers and surrounding communities (Ellen MacArthur Foundation, 2017; Ingallina, 2018; Pla-Julián & Guevara, 2019). Finally, CSs in the TAVC are labor-intensive, highly feminized and have a high presence of vulnerable populations (e.g., ethnic minorities, refugees, and low-skilled low-income workers) (English, 2013; Fletcher & Tham, 2014; Kate & Theuw, 2016; Llorente-González & Vence, 2020; Neetha, 2002; Van Nederveen Meerkerk, 2018). Therefore, assessing these distinct aspects

of CE in the sector is vital, as circular jobs could recreate the same prevalent low existing working conditions as in the linear business model. This could amplify existing gender, and social inequality gaps should circularity continue to grow in the sector.

Although small and medium businesses (SME) in the TAVC account for more than 60% of employment in high-income countries, e.g. EU (OECD, 2021, pg19) and more than 50% in low-income countries (Notten, 2020, pg 63), most research on CE and CSs implementation has focused on the role of large and established firms (Henry et al., 2020). There is scant knowledge about how circular startups and other SMEs can create social impact and better jobs. Furthermore, research on CE and its job creation potential has been concentrated mainly on Europe with few scientific contributions from the global south (Aich, 2019; Chiappetta Jabbour et al., 2019; Ingallina, 2018; Kirchherr et al., 2017; Padilla-Rivera et al., 2020, 2021; Preston & Lehne, 2017; Repp et al., 2021; Schroeder et al., 2018). This chapter addresses the lack of knowledge about the social impact of the different CSs implemented in the sector. It will assess the social impacts of CSs in terms of quality of job (QOJ), workers sustainable livelihood (SL) and gender equality and inclusion (GE&I) using a novel social impact assessment framework for circularity called *SIAF-CE* developed in Chapter 2 (Suarez-Visbal et al., 2022a). In addition, the following questions are addressed in this chapter.

I) How do the regional and the global TAVC compare with each other from the lens of *SIAF-CE*?

This question is relevant because a comparison between countries that operate in the TAVC allows us to assess how deploying circular strategies in different geographies with a certain degree of proximity (global or local-regional level) influences the quality of jobs, community well-being, gender equality and social inclusion. Which is also relevant when planning for future territorial development policies.

II) How does the implementation of circular strategies by startups and incumbent companies contrast with each other in terms of social impacts?

This question is relevant because the comparison between incumbent and start-up companies allows us to assess whether different types of businesses are more drivers than others in creating positive social impact.

III) How do different CSs in the apparel sector affect male and female workers?

This research contributes to the body of literature on CE by justifying the use of the *SIAF-CE* at the micro-level (companies) while providing evidence on the current CSs social impact implemented by startups and incumbents in regional and global contexts. This thesis uses a mixed method approach, and it is organized as follows: Section 2 covers the theoretical backbone regarding CE and its social impact ambition. Section 3 describes the different methods adopted. Section 4 contains the results on the social impact of CSs implemented by different types of businesses in the three countries of interest. In section 5, the discussion, recommendations for businesses and policymakers, limitations and potential directions for future research are addressed, followed by conclusions in section 6.

3.2 Theory

3.2.1 Circular Economy in the Textiles & Apparel Value Chain

The concept of CE has become popular in academia policymakers and businesses due to its capacity to engage a multitude of stakeholders given its systemic approach (Kirchherr et al., 2017; Prendeville et al., 2018). However, the current focus of CE remains largely on value creation through better management of material resources but overlooks the social aspects of production processes and parallel socio-cultural transformations (Kirchherr et al., 2017; Murray et al., 2017; Pla-Julián & Guevara, 2019). CE can be defined as an economic system that privileges strategies to reduce, reuse, recycle and recover materials in value chain processes, operating at the micro, meso and macro levels, to accomplish sustainable development, creating environmental quality, economic prosperity, and social equity, to the benefit of current and future generations (Kirchherr et al., 2017).

This research focuses on the micro-level of the TAVC, which is characterized as a complex system of large and small businesses operating at various geographical locations between the textile, apparel, distribution, retail, and textile recycling industries (Dunford, 2004; Notten, 2020). The TAVC is highly feminized, with more than 75% of workers being women (Fletcher & Tham, 2014; Neetha, 2002). It also holds a high level of job informality, in the production and end of life segment (Ascoly, 2009). Additionally, it is highly fragmented, which comes with a complex net of relations and power dynamics between the different stakeholders from brands, suppliers, workers etc. (Hale & Wills, 2008).

The TAVC has historically developed with characteristics that are still very present today. "In the first half of the twentieth century, industrial work in textile and apparel assembly jobs provided an entry point for participation of

rural women in the formal economy in developed and developing countries. By the 1970, textile manufacturers had consolidated several global assembly lines that relied on a wide world decentralized and feminized labor force” (English, B. 2013, pg72). This phenomenon exploded in the nineties, catapulting most brands, motivated by cheaper labor and fewer stringent regulations, to migrate their manufacturing facilities to developing nations while keeping the most value-added part of their operation (marketing & sales) in developed countries (Fukunishi et al., 2013).

This type of production commonly known as fast fashion is characterized by low prices, high collection rotation, and massive cheap production mainly done offshore, using a global VC (Bhardwaj & Fairhurst, 2010; Fletcher & Tham, 2014; Foroohar, 2005). This massive globalization of production appeared due to technological changes, the evolution of production costs, the emergence of critical international competitors, and the elimination of import quotas after 2004 (Kozlowski et al., 2014).

Additionally, in the TAVC, startups and SMEs are not only abundant, but they also play a role in the transition to circularity (Henry et al., 2020). Today companies implement different circular business models (CBM) and circular strategies to extend the useful life of resources, while preserving value at the highest possible level of utility (Jackson et al., 2014; Sakr et al., 2011).

The R-Framework has been used to conceptualize the principles of Circular Economy. It distinguishes between different CS to embrace circularity in a hierarchical order (Achterberg et al., 2016; Linder & Williander, 2017; Shao & Ünal, 2019; Urbinati et al., 2017). References around the R-framework in literature are numerous, ranging from 3 Rs (Reduce, Reuse, Recycle) (Blomsma & Brennan, 2017; Sihvonen & Ritola, 2015) to 10 Rs (Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, Recovery) (Kirchherr et al., 2017).

There are specific CSs that are most relevant for the TAVC. *Table 3.1* describes the CSs used by companies in the TAVC compared to the 9R framework used in CE at large. The 9R ladder privileges strategies higher in the R-hierarchy, closer to R0. However, In the TAVC these strategies are scant. *Table 3.1* also indicates the place of CS in the TAVC and delineates their territoriality performance according to (Stahel & Cliff, 2016), where circular strategies such as Resale, Rental, Repair and Remanufacture are considered most effective on local and regional levels as they capitalize on product proximity while Recycling and use of recycled material can be more effective on a regional or at a global scale.

This is due to cost consideration, the volume needed for cost-effective recycling and the existence of recycling infrastructure. The current recycling process is mainly mechanical, therefore, labor intensive, which motivates companies to offshore this part of the process to cheaper labor countries. To be cost effective, mechanical recycling requires a larger volume of textiles, which is often not enough at the city or local level. Additionally, other than territoriality, CSs can be influenced by the ecosystem actor's interaction, by targeted CE policy and the level of social ambition (Corona et al., 2019; Lazarevic & Valve, 2017; Nogueira et al., 2019; Stahel & Cliff, 2016).

Table 3.1 Circular Strategies applied in the TAVC compared with generic CE strategies.

PBL 9R		Global Localization of Apparel Value Chain											
Ladder	Circular Strategies	Description/Stage of TAVC					Territory	Extraction	Design	Manufacturing	Distribution	Use	End-of-Life
R0 Refuse	Re-design (R1)	Designing apparel with a lifecycle mindset by using DfD (design for disassembly) or DfEoL (design for end of life). (Guldmann, 2016; Sassanelli et al., 2019).					Local/ Regional		●	●			
R1 Rethink													
R2 Reduce	Reduce/ resource Recovery (R2)	Includes On-demand production and Incorporation of circular supplies as recycled yarn, close loop dyes etc. (Ellen MacArthur Foundation, 2017; Guldmann, 2016).							●	●			
R3 Reuse	Rental (R3)	A product life extension strategy. Refers to paying a fee for using a garment. It includes luxury, well-known brands, local designers and selected Vintage items (Accenture Strategy & Fashion for Good, 2019; Ellen MacArthur Foundation, 2017; Guldmann, 2016; Lacy et al., 2014).								●	●	●	
	Resale (R4)	A product life extension strategy. It includes second hand and vintage items sold online or on brick & mortar store (Accenture Strategy & Fashion for Good, 2019; Ellen MacArthur Foundation, 2017; Guldmann, 2016; Lacy et al., 2014).									●	●	●
R4 Repair	Repair (R5)	A product life extension strategy. It includes onsite in-house, Repair tours, third party Repair and DIY kits (Accenture Strategy & Fashion for Good, 2019; Guldmann, 2016; Jung & Jin, 2016).									●	●	●

Global Localization of Apparel Value Chain			Territory	Extraction	Design	Manufacturing	Distribution	Use	End-of-Life
PBL 9R	Circular Strategies	Description/Stage of TAVC							
Ladder									
R5 Refurbished	R6 Remanufacture Remanufacture (R6)	Using parts of a discarded product to create a product with same function (Reike et al., 2018). Also include the so-called upcycling fashion understood as “clothing constructed by using reclaimed fabrics, which can either be post-industrial or post-consumer waste and were the quality of the remanufactured fashion clothing is equal or better than brand new fashion clothing” (Accenture Strategy & Fashion for Good, 2019; Dissanayake & Sinha, 2015; Guldmann, 2016; Jung & Jin, 2016).	Regional						
R6 Remanufacture									
R7 Repurpose									
R8 Recycle	R7 Recycle (R7)	Includes all the processes from the collection of textiles to sorting to actual recycling. It can be mechanical or chemical (the latter one still very new and it is linked directly to the resource recovery or circular supplies (Accenture Strategy & Fashion for Good, 2019; Guldmann, 2016; Jung & Jin, 2016).	Regional/Global						
R9 Recover (energy)	R8 Recover (R8)	Once final sorting is done, the scrap left over is then used as feedstock for energy recovery (Yousef et al., 2019).							

3.2.2 Social impacts in TAVC jobs

The TAVC plays a vital role in many countries' economic development, being an important source of employment creation (Franco, 2017; Ozturk et al., 2016; De Souza et al., 2010). However, the linear TAVC presents high risks of exploitative situations. Annex 3.1 summarizes the most relevant social impacts, specifically in the manufacturing, retail, and end-of-life segments. It shows work precariousness with low payment, low working conditions, low workers representation with a high presence of part-time jobs and unconventional working contracts (Asia Floor Wage Alliance, 2016; Brent et al., 2021; ETUI, 2019; IDEA Consult, 2017).

There are several considerations of social impacts in literature, however, CE social impact ambition has been defined by many authors as the creation of jobs (Geissdoerfer et al., 2017; Millar et al., 2019; Murray et al., 2017; Schroeder et al., 2019). This definition is narrow in scope and depth (Dufourmont et al., 2019; Dufourmont & Goodwin Brown, 2020; Mitchell, 2015; Willeghems & Bachus, 2018). Even though employment is one of the most critical enablers of poverty reduction, low-quality jobs keep workers disfavored; quality jobs should also be good for the worker's families and the communities where they are implemented (Glewwe, 2014; International Labor Organization, 2018; Rubery, 2019). Circular strategies are realized through Circular Jobs. Core circular jobs include Repair, Resale, Rental, and Recycling (Llorente-González & Vence, 2020) while transport logistics, governmental and educational activities have been defined as enablers of secondary jobs (Dufourmont et al., 2019; Papú Carrone et al., 2021).

There has been a growing number of studies analyzing the potential of a CE to generate jobs. Some reports indicate a positive correlation between CE and employment (Dufourmont et al., 2019; International Labor Organization, 2018; Willeghems & Bachus, 2018). Other studies state that increased recycling, reuse, Repair, and Remanufacturing can create jobs for employees displaced from traditional manufacturing and lower structural unemployment (Cambridge Econometrics et al., 2018; Mitchell, 2015). In the TAVC, there is scant knowledge over the quantity and quality aspects of these jobs. Papú Carrone et al., (2021) emphasize the job creation potential of Repair and Resale in the Dutch TAVC, while Repp et al., (2021) highlight job creation potential in Europe and the adverse employment impacts in production countries. Finally, Llorente-González & Vence, (2020) argue that Reuse and Repair are associated with low salaries and high rates of unpaid work in Europe. This evidences the need for a more detailed social-economic analysis of CSs in the different geographies to avoid employment trade-offs throughout the TAVC.

3.2.3 Social Impact Assessment of Circular Economy

Although several frameworks exist to assess social impacts within the sustainability field, there is scant literature around social impact assessment frameworks (SIAF) for circularity (Elia et al., 2017; Merli et al., 2018; Millar et al., 2019). CE presents system characteristics that can benefit from a more comprehensive social impact assessment approach. This chapter uses one of the first frameworks attempts to cover this gap. This social impact assessment framework is called the *SIAF-CE*, presented in Chapter 2 (Suarez-Visbal et al., 2022a). It takes a worker's perspective to address critical issues in the TAVC, such as gender inequality, inclusiveness and just transition (Circle Economy, 2020; Rubery, 2019; Schroeder et al., 2019; Willeghems & Bachus, 2018). This framework was operationalized, validated, and tested in Chapter 2 with sixty cases in The Netherlands.

As depicted in Figure 3.1, the *SIAF-CE* uses the allegory of a flower where each set of leaves represents three social dimensions: quality of jobs (QOJ), in orange, well-being and sustainable livelihoods (SL) in pink leaves, and gender equality and inclusion (GE&I) in purple. The outer leaves in green represent the socio-cultural background and inherent power dynamics. They are not a dimension per se, but they have an overall effect on all other dimensions (Madhok & Rai, 2012).

The first two dimensions of the *SIAF-CE* build upon two pre-existing well-known tools, the OECD quality of job framework (Cazes et al., 2015) and the sustainable livelihood framework (DFID, 2000). The third dimension, GE&I, is based on the eight building blocks of women economic empowerment (ICRW, 2016) and in the BSR gender equality social auditing tool (BSR, 2019).

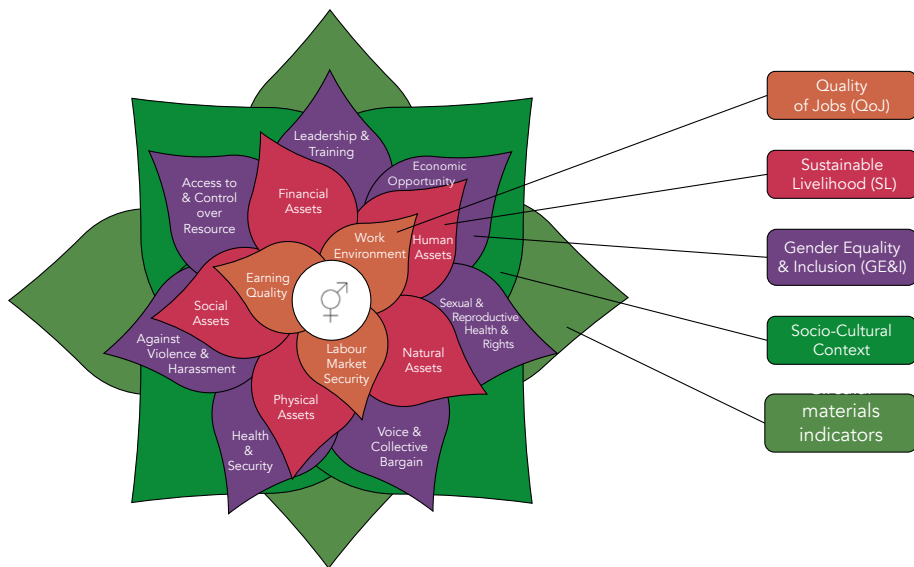


Figure 3.1 The flower SIAF-CE♀. Each layer of petals represents one social dimension, and each petal represents an indicator. Outside layers represent the socio-cultural context and power dynamics. Source Chapter 2 (Suarez-Visbal et al., 2022a).

The SIAF-CE♀ measures 15 composite, multi-attribute, qualitative indicators. The quality of job dimension (QOJ) comprises three indicators: *earning quality*, *labor security* and *quality of work environment*. This is the first dimension analyzed because it focuses on the job and its direct impact on the individual worker. Well-being is represented by the five indicators of the sustainable livelihood framework (*physical assets*, *social assets*, *human assets*, *natural assets*, and *financial assets*).

The gender equality and inclusivity (GE&I) dimension considers seven indicators (economic opportunity, training, and leadership skills; access and control over economic resources and opportunities; voice & collective bargain society; violence & harassment; health & security; sexual & reproductive health and rights (SRHR)). The SIAF-CE♀ uses this multidimensional gender-disaggregated approach to minimize overlooking potential trade-offs among different types of workers, CSs and countries where CSs are employed.

3.3 Methods

3.3.1 Research design

The research was conducted in two phases. The first phase was guided by a qualitative approach consisting of desk research, semi-structured interviews,

a thematic and intersectionality analysis. The second phase undertook a quantitative approach consisting of worker surveys based on the *SIAF-CE*³. Each of the research questions was answered in section 3.4 following the two phases described below.

3.3.1.1 Qualitative phase

Phase one consisted of three steps: (1) the scoping of the population and sampling selection, (2) the data collection, and (3) the data analysis.

Population

The population consisted of businesses that complied with the following criteria: i) currently implementing one or more of the 5 CSs mentioned in table 3.1; ii) being either a startup³ or an incumbent business operating in either the Netherlands, Spain, or India and iii) having direct staff or subcontracted staff in one of the three locations. These countries were selected because The Netherlands plays a pioneering role in circularity in the TAVC. Spain is an important supplier of (sustainable & recycled) fibers, fabrics, and clothing to the rest of Europe. At the same time, India is a critical hub for both textile and clothing manufacturing for Europe. Additionally, to select countries, the following criteria were used. i) Country should play a relevant role in the TAVC either as production or consumption countries, ii) represent geographical diversity iii) have a certain level of implementation of Circular Economy in the sector and CE policy ambition. Additionally, previous links in these countries facilitated companies' participation in the research (convenient sampling).

Population includes suppliers of recycled fabrics, manufacturers, brands, retailers and B2C platforms, independent or in-store repair workshops and textile-sorting and recycling companies as well as labor NGOs, academics, think tanks and governmental agencies (considered as experts). Two incumbents and two startups were chosen per country for each of the five CSs. For interviews, snowball sampling was used. Considering that the TAVC comprises diverse stakeholders varying in size, type, and role, we classified this group as heterogeneous. Following Hagaman & Wutich, (2017) and Spiers et al., (2018) saturation was reached for the sample with around 30 interviews in each country, out of which five were with experts and twenty-five with business stakeholders.

Data collection

There were three means of data collection: i) desk research, ii) semi-structured interviews and iii) worker surveys. The desk research was conducted in Google

3 Around six years of existence according to the OECD definition.

Scholar and Scopus. It included both scientific papers and grey literature from governmental and companies reports and studies from 2000 until 2021. The search terms “social impact of circular strategies”, “circular fashion and social impacts”, “social impacts in the TAVC” were used to find relevant scientific literature. The literature review was validated with data triangulation (Long & Johnson, 2000; Sandelowski, 1995).

A total of ninety semi-structured interviews were performed, in all three countries. Experts’ interviews contributed to setting the context of circularity in the sector, and business stakeholders’ interviews contributed to the state of CSs in their own company and their current assessment of social impacts. We interviewed the CSR manager and human resource/operational manager in incumbent firms and the director/founder on startups in each company. Two interview guides were developed based on *SIAF-CE*: one for companies and one for experts and policymakers. Semi-structured interviews were pre-tested and validated with three professionals from the field. As they were anonymous, an identifier was created for each interviewee. Starting by country, followed by a C for consolidated, S for startup and an E for expert. Surveys based on the *SIAF-CE* were composed of 85 multiple-choice, and five open-ended questions, where 28 referred to socio-demographic factors, 27 to the GE&I dimension, 19 to SL and 16 to QOJ. In Chapter 2 Suarez-Visbal et al., (2022a) operationalization process, surveys in each country were tested on reliability through a Cronbach’s alpha analysis.

Data analysis

Literature was analyzed through content analysis. Each CS by country was considered, emphasizing on i) CE policy for the sector and social impact ambition, ii) ecosystem development, iii) the most advanced CSs, along with their territorial focus (local, regional, global), and iv) their social impact in terms of QOJ, SL and GE&I. To create the eco system maps, the 5R framework was used (USAID, 2016). This framework highlights five basic components of a social system: Resources, Roles (stakeholders), Relations, Rules and Regulations and Results. The data for the map was extracted from the semi-structured interviews and desk research by looking at the place, role, and type of relationship between different stakeholders in each country and the TAVC. The size of the business bubble was determined based on the type of company (small bubble for startups, medium size bubble for SMEs and larger bubble for consolidated).

Semi-structured interviews were conducted in English, Spanish, and Hindi. These were transcribed and translated to English using the software otter.ai. All interviews were coded thematically in three iterations conducted by

two other analysts in India and Spain. Pre-selected codes were based on the interview guides for both business and experts and the three dimensions of the social impact assessment framework for circularity *SIAF-CE*⁴. Finally, an additional intersectionality analysis was performed to identify better how the livelihood of the different type of workers are impacted by the different circular jobs created⁴.

3.3.1.2 Quantitative phase

The quantitative phase followed the same steps as above.

Population

The population was composed of female and male workers directly and indirectly involved in implementing the CSs of startups and incumbents' businesses identified in the previous phase. An equal representation of male and female workers among the identified CSs was sought. Given the population's heterogeneity and considering the 15 measurable variables (indicators), the sample size was established at 150, with a minimum sample of 50 subjects for each country (Ramos-Galarza, 2017). Our final sample consisted of 210 surveys performed in the three countries between January and July 2021 (See annex 2.1 for questionnaire).

Data collection

Data in this phase was collected using face-to-face and online surveys based on the *SIAF-CE*⁴. Surveys were anonymous and confidential and were translated to Dutch, Spanish, Arabic and Hindi (due to the high immigrant proportion of the population). Surveys were conducted in English and these alternative languages by a team of three research analysts that received gender-sensitive training on survey techniques, worker interview approach, building report and addressing sensitive issues.

Data analysis

The *SIAF-CE*⁴ responses were ranked on a 4-points Likert scale, ranging between 1-4 to score indicators for each dimension, as indicated in table 3.2. As several Likert scales were used for different indicators, data were treated as interval data, allowing for descriptive statistics. Frequency, mode, and mean were developed. Surveys provided a combination of nominal data and ordinal data. All data sets were verified to be within a range of 1 to 4. During the

⁴ Intersectionality analyses how gender inequities manifest within a particular social context, how they intersect with other social stratifiers such as race, class, migration status and the compound effect this intersection has on the quality of their jobs, their livelihood and inclusion of different workers. Intersectionality does not have a prescriptive process but suggests approaches adapted to the context (McCall, 2005).

survey, participants were consistently asked to verify their degree of answer between agreeing and strongly agree and disagree and strongly disagree to suffice controversies around the nuance of responses of Likert scales.

Table 3.2 Scale adopted to rank the indicators of the SIAF-CE^q.

4-points Likert scale scores	General ranking scale for SIAF-CE indicators	Ranking scale for earning quality (QoJ area)
LOW (1)	Insufficient/poor performance of the indicator	Below or equal to the poverty line
MEDIUM-LOW (2)	Sufficient but minimal performance of the indicator	Between the poverty line and minimum wage
MEDIUM-HIGH (3)	Sufficient performance	Between minimum wage and living wage
HIGH (4)	Better than sufficient performance of the indicator	Above living wage and average salary in the sector

Data were included in a Microsoft excel database. Three different selections were made. First, CSs were grouped by CS, country and workers and then compared with each other. Then it was grouped by male and female workers and by business typology and then compared. Finally, CSs were grouped by CSs, country and workers and then compared.

Results were presented in a circular bar chart showing the value of the indicators from (1) *LOW* to (4) *HIGH*. The graph is divided equally into three areas to plot the indicators of each dimension (*QOJ*, *SL*, and *GE&I*). Each indicator is shown with two bars, one bar for females and another for male workers as described in Chapter 2 (Suarez-Visbal et al., 2022a).

3.4 Results

Results are organized by research questions. First question by country, second question by business type and third question by circular strategies.

3.4.1 Regional and global apparel value chain social impacts.

In this section, an argumentation of each country's national CE policy and social impact ambition is made, followed by a discussion about ecosystem development and most developed circular strategies. Then, the social impacts of the TAVC in the three countries are compared with the SIAF-CE^q framework.

3.4.1.1 The Netherlands

The Netherlands has a national ambition for CE and a specific policy regarding the TAVC. This is summarized in the “Policy program for Circular textile 2020-2025.” The current social ambition is only linked to creating jobs and paying a living wage (Ministry of Infrastructure and Water Management, 2020; SER, 2017). For businesses, the social ambition is linked to creating local or regional jobs by reshoring the value chain back to Europe (NLS10, NLS01, NLS05, NLE02).

Figure 3.2 showcases the TAVC ecosystem, including the roles and relations along different parts of the value chain. The Netherlands has several knowledge-share institutions, intersectoral associations, and governmental bodies supporting circularity and employment. At the municipal level, programs such as STIP⁵ promote employment to populations distant to the job market, benefiting several social enterprises where CSs such as Remanufacture and Reduce are currently evolving. However, some startups believe there is a lack of financing for circular alternatives. According to (NLS09), “CSs are hard to finance in traditional banking, as Rental or leasing contracts are hardly accepted as collaterals.” Additional barriers to creating decent local jobs are i) the slow increasing volume on circular demand, ii) the higher price of circular items, iii) the lack of manufacturing skills, and iv) the low scalability of present circular business models as put by experts (NLE02, NLE10).

In terms of CSs, Resale is the most consolidated one (Hekkert et al., 2021). It includes traditional brick-and-mortar stores run by NGO’s, vintage, and second-hand shops, B2C and C2C Platforms. The Netherlands is well-positioned for Resale and Remanufacture because larger brands have distribution centers in Belgium or Germany. “Being close to the source of the product is critical from a timing and environmental standpoint, especially with COVID restrictions, where online sales and returns (that cannot be resold) soared and needed to be channeled some other way” (NLS07). Additionally, the in-house Repair and the number of independent Repair shops have grown around 20% both in the Netherlands and other global Repair shops as expressed by (NLC02) and (NLC04).

Another evolving CS is Rental, characterized by the corporate (B2B) model focused on uniforms and the B2C platforms, populated by early-stage startups. They either work with a subscription model, leasing, or both, paying per month or item. Finally, Recycling is currently facing significant barriers to develop further because of i) low quality of fast fashion items, ii) low prices given the

5 Acronym in Dutch for jobs with a social pathway in perspective

global surplus of used textiles, and iii) low consumer awareness of how to recycle clothes. According to (NLC13) and (NLE20), these factors impacted revenue and the number and quality of jobs available.

Different apparel circular value chain components are being developed across the European region. As put by (NLE02): “companies in Italy, Spain and France are trying to set up regional cycles for recycling fibers, spinning into yarn, fabrics and garments.” Furthermore, COVID-19 has accelerated the awareness about the limitations of offshore production, which has fueled the idea of circularity in a more regional or local sense. As (NLS09) says: “Although manufacturing in Portugal or Poland is more expensive than in China or Bangladesh, I have fewer things to worry about. Because at least people here can join a union or share their stories with news reporters; here, there are checks and balances...”

3.4.1.2 Spain

Spain has a generic CE policy with special provisions for the textile sector and employment and skill upgrades. These are described in the “Spanish CE strategy and action plan 2030.” Like in the Netherlands, this plan is largely influenced by the European green deal and the European strategy for Circular textiles. The CE social ambition of both policy and businesses is also low and is linked mainly to local job creation. As (SPS06) said: “There is no Circular Economy if there are no local jobs to recirculate items.”

As seen in Figure 3.2, there are NGOs, think tanks, and academic institutions in the sector in terms of ecosystem development. There are also governmental programs run by the ministry of industry and economy (with circularity and innovation specific funds). However, according to (SPE02) the ecosystem is not fully functional as “there is an enormous gap to articulate manufacturers with recycled textiles.” According to (SPE01) “in terms of valorizing these textiles and finding an economically interesting way to sell them, there is still a lot to do.”

The most developed CSs are Resale and Rental with a combination of B2C, C2C platform models, traditional vintage and second hands stores. The market is shared by NGOs and, recently, by online startups. According to a global study, Resale grew 49% between 2017 and 2018 (Thred Up, 2021). Spain is following similar trends. Repair has been revamped by innovating green tech-startups promoting monthly subscription models offering Repair and washing to customers, while propounding entrepreneurs franchising self-employ opportunities. Finally, Recycling, in which informality is high, is regularly the subject of cases of refugees and illegal migrant exploitation (Calvo, 2020; El Español, 2020). Several NGOs bring voice, housing, and job opportunities for

legal migrants, but there is a structural problem as new illegal workers arrive continuously (SPC05).

3.4.1.3 India

India has a CE national policy, and although the Ministry of Textiles is now promoting sustainability with initiatives such as Su-Re, (Sustainable Revolution), textiles are not prioritized in the CE national plan (Niti Aayog, 2021). According to (NLE10), "There is a lack of system thinking between CE ambition and policy. Even though the textile industry is very influential, it is not connected to CE policy development", there is also not mention of a social ambition related to jobs.

In terms of ecosystem development, as seen in Figure 3.2, there are also think tanks, NGOs, and foreign governments supporting projects and startups related to circularity in the sector. However, according to UNEP, work needs to be more collaborative if truly transformational results are expected. Additionally, according to (INE06), "there is a lack of enabling environment to reach scale, as capital, knowledge, and networks are not entirely in place. Currently, only a few startups are paving the way. "Finally, businesses seem to agree that the road to circularity is still being built. As (INS02) said, "with CSs such as Remanufacturing, whatever you do is less efficient than working linearly. There are quality issues; there is no consistency in the supply."

Based on our findings, India's most prominent and fast-growing CSs are Resale and Rental, supported by a growing local market. The local online fashion Rental market valued at around US\$ 3-4 billion has seen exponential growth with several existing players as well as startups (Krishna, 2019). However, job creations and conditions don't seem to be a primary concern of startups as they are just trying to develop their circular strategy. Remanufacturing is also increasing, mainly because it is labor-intensive, giving India a competitive advantage as according to (INS02), "Remanufacturing in a western country, will be too expensive." Moreover, India's textile recycling sector which has a long tradition within Panipat region, bringing in over \$62 million (Bairagi, 2014; Sikka & Brar, 2018); shows an increasing demand for recycled fabric and yarn, according to (INC06, INC05). Additionally, according to (NLE08)," as circularity affects the creation of yarns and fabrics and as India is a significant exporter of both, there is an interesting opportunity for Indian manufacturers who have decades of experience creating recycled yarns."

Finally, in regard to geographical and territorial aspects, it is relevant that 70% of interviewed businesses in all three countries operate according to the same "third-party manufacturing contracting" model in the conventional TAVC. In

this model, companies have only administrative staff on their payroll while a third party does their production in the same country or abroad. Incumbent businesses in the Netherlands and Spain outsource mainly to Turkey, Morocco, and India, while SMEs and startups outsource to small workshops locally or regionally.

At the same time, CSs as Resale, Rental, and Repair are operating locally at the city level, while incumbent businesses implementing recycling and using recycled materials are operating mainly globally, as production and repurposing of used textiles happen in Eastern Europe, Turkey, and India (NLC03, NLSM01, NLC02, NLS09, NLC04). This seems to corroborate the suggestion of (Stahel & Clift, 2016) that different CSs operate optimally at different geographic scales, but they are also replicating existing production patterns.

When comparing CS's social impacts in the three countries, as seen in Figure 3.3, India shows the lowest QOJ, explained by the medium-low earning quality and job security indicator of female workers; although Dutch women workers show a low earning quality especially when compared to male workers. In all three countries in the Sustainable livelihood dimension, the lowest indicators were social and financial assets in the lower spectrum of medium-high, which can be linked to the low earning and thus the low saving capacity of these workers.

GE&I is medium-high in all three countries, with health & security being the highest indicator for men and women. This score is surprising and can be explained by the fact that some of the health effects of CE result from constant exposure to chemicals over time, and are more likely noticed in the long-term, while the survey health issues were considered over the last 12 months. Additionally, the fact that in the Netherlands and Spain, and until 2018 in India, every worker needs to be covered by health insurance could have also influenced workers response (Bank Bazaar, n.d.; Employees' State Insurance Corporation, n.d.). Additionally, voice & collective bargaining and violence & harassment seem to be lower than other indicators. This can be partially explained by the fact that most of the businesses operating CSs are startups and SMEs with few employees who do not have a labor union. Moreover, in the Netherlands, some businesses with a CAO (collective labor agreement) for their sector were unaware of its existence, evidencing the labor union's need to re-engage with this constituency. Additionally, the low score is also corroborated by our literature findings, these issues are hard to bring up because of shame and fear of losing their job (BSR, 2019; Casey, 2006).

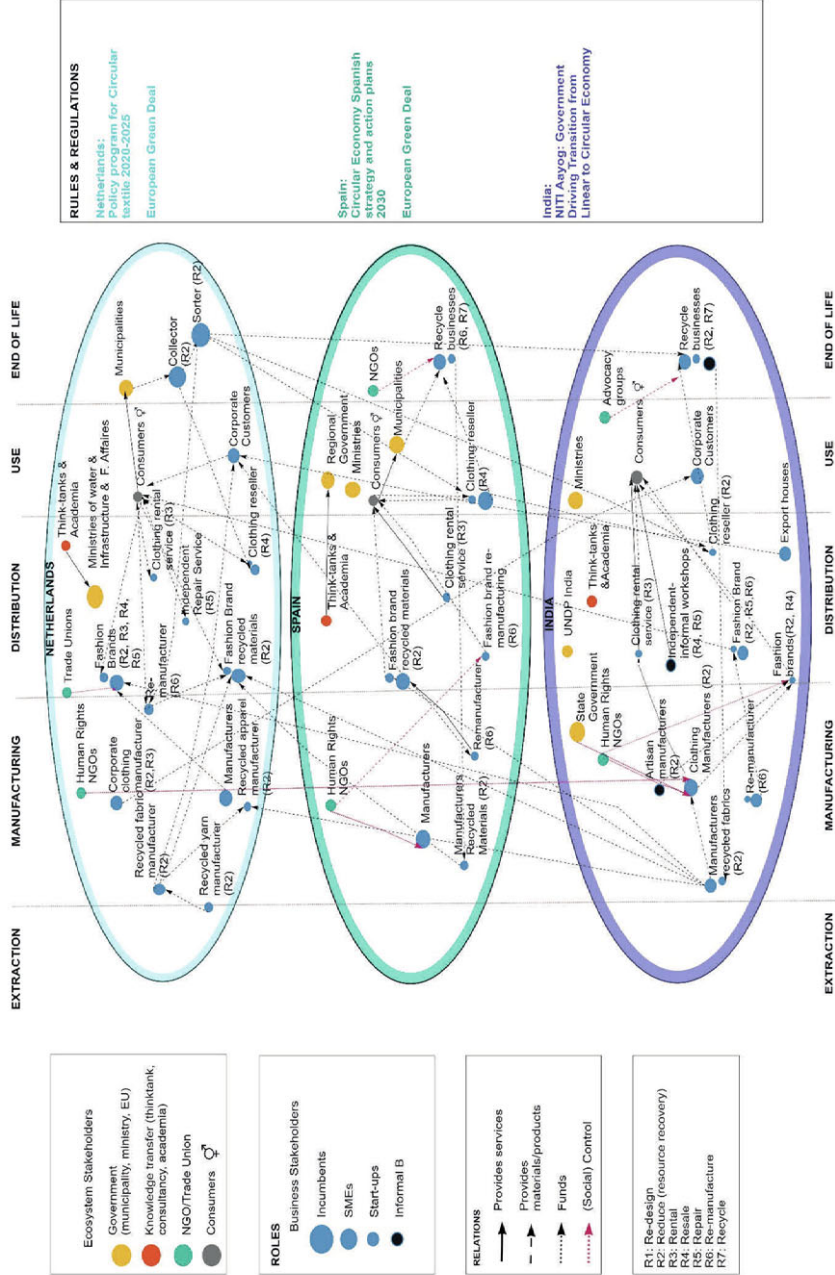


Figure 3.2 System map of The Netherlands, Spain and India, showcasing system stakeholders' roles and their relationship.

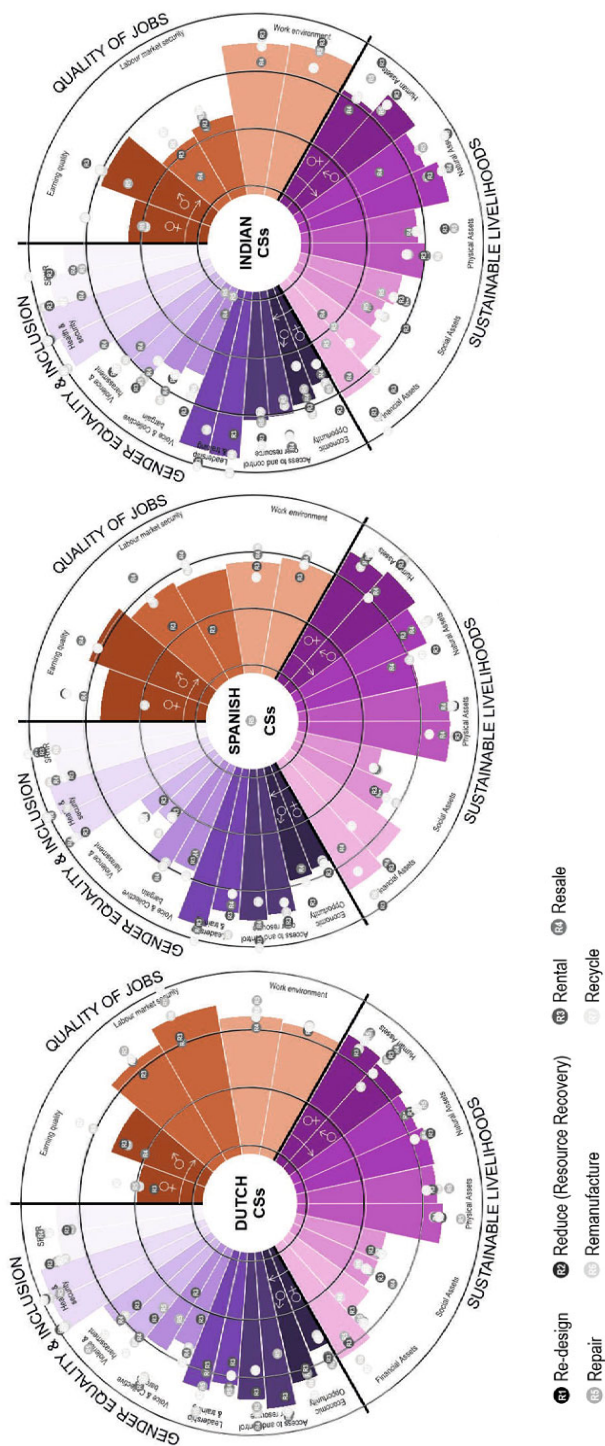


Figure 3.3 Social impacts of all circular strategies combined represented by a respective R number in The Netherlands, Spain, and India.

3.4.2 Implementation of circular strategies by types of companies and their social impact

Startups and SMEs are very prominent in circularity, representing 65% of our sample, as seen in Figure 3.4. This corroborates literature findings that place startups as a critical actor in advancing circularity in the sector. They are also the ones advocating for local job creation⁶. Informal workers also represent an important share of jobs in India. In our sample, they represent 32% and are concentrated in Repair and Resale. Although literature suggests that they are also very present in the Recycling phase.

It seems that when thinking of circularity, businesses primarily see the environmental angle and not so much the workers' well-being⁷.

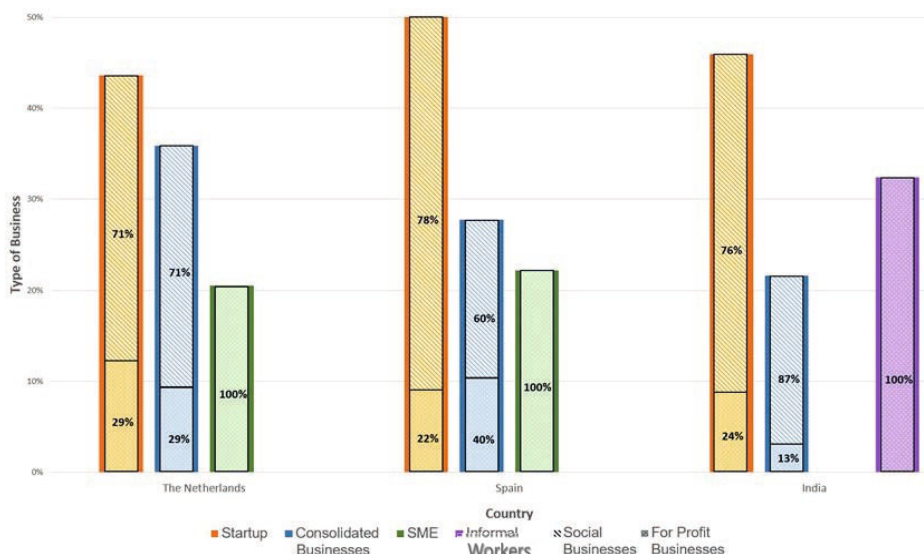


Figure 3.4 Percentage of social business and for-profit⁸ business amongst Startups, consolidated and informal workers in the three countries.

However, in all three countries, mission-driven businesses, commonly referred to as social actors (such as social businesses, NGOs and cooperatives), seem to play a critical role, as seen in Figure 3.4. These actors have inclusion and

6 (NLS10): "It does not make sense to use local post-consumer material if it travels four times around the world to be processed, transformed, and manufactured before we have it back into our clothes."

7 (NLE01): "There is just not a huge awareness about people working on circular business models, nor in how they should begin to approach the topic and the success criteria."

8 The distinction for profit and social business is made to highlight that social business are driven by a social mission and not only a for profit only goal.

integration goals in their mission and are pivotal in helping people move up the local work ladder. As put by (SPC05), “social businesses have workers concern more present because they are on the core of their work.” Yet, according to (NLE01), “these social training jobs can sometimes distort the system, affecting the consolidation of CSs in the sector.” These jobs are meant to train people in their employability soft skills, not hard skills like making a dress or fixing one. So, reliability in the quality of work is not always present.

On the other hand, it is hard to create expertise when the demand for these local jobs is precarious. There are very few sewing ateliers in the Netherlands that can provide full-time employment with basic benefits, as pointed out by (NLE05). It is thus pivotal to address this distortion to avoid training jobs to replace permanent jobs, ensure permanent good jobs in the sector are offered, and to make sure training jobs also work on hard skills.

Comparing different kind of business and their social impact, Figure 3.5 shows that startups' earning quality displays contrasting differences between male and female workers, where women earn around 1/3 of their male counterparts. This pay gap is smaller in SME and incumbent businesses than in startups and informal workers. Additionally, as said by (SPE02) “even though startups are born with circular DNA, most are making marginal sales volumes that create precarious jobs for entrepreneurs, which forces them to have alternative income sources.” This is true for Resale and Rental startups in the Netherlands, and some Remanufacture startups in Spain. According to almost all indicators, incumbent businesses in all three countries provide medium-high quality jobs and reduced gender gaps. This can be explained by the fact that incumbent businesses with more than 50 employees must, by law, have a gender equality policy in Spain.

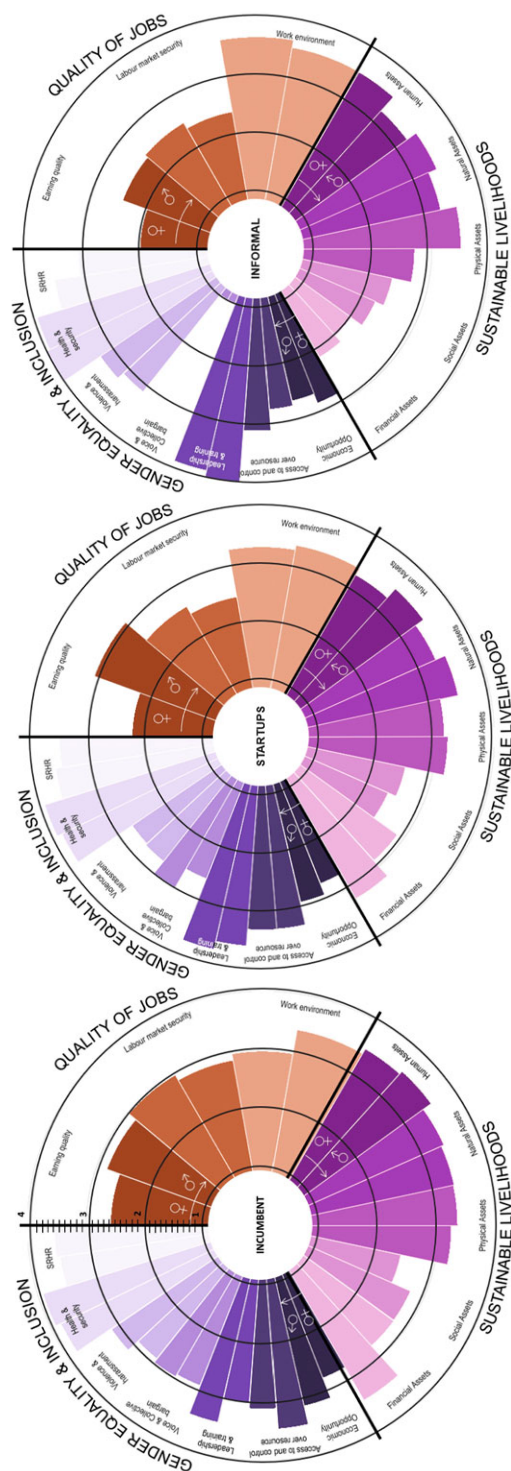


Figure 3.5 Comparison of social impacts between informal workers, incumbent and start-ups CS workers.

3.4.3 Social impacts of circular strategies for workers

Results in this section start by describing the circular jobs and their socio-demographic characteristics and then comparing the social impact of each CS in three countries. Details for all jobs can be found in annex 3.4.

3.4.3.1 Rental

Typical jobs in Rental include designers, logistic clerks, project managers, sales representatives, and tailors (only in India). Table 3.3 shows the most relevant Rental job characteristics per country.

Table 3.3 Most relevant Rental jobs characteristics per country.

Country	Manager		Logistic clerks	
	Majority gender	Job characteristics	Majority gender	Job characteristics
Netherlands	Women (60%)	Part-time (self-employed) with salaries around minimum wage	Male immigrants (90%)	Full-time
Spain	Women 60%	60% permanent	NA	NA
India	Male (90%)	60% fulltime permanent	Male (100%)	Permanent full time

In India, at B2C Rental platforms, all logistical clerks and tailors are also male. This result can be explained by the fact that logistics Rental jobs focused on sorting, packing, and transporting heavy loads are seen as “male jobs”, as corroborated by our interviewees⁹.

As seen in Figure 3.6, when comparing the social impacts of Rental in all countries, we see contrasting realities in the *QOJ* and the *GE&I* dimensions. While in the Netherlands *earning*, *quality* is the lowest indicator for both female and male workers (1,7♀-2,4♂ respectively); in Spain, it is the highest for females (3,3♀), and in India for male workers (3,6♂). *SL* dimension in all three countries looks very similar, with only *financial assets* being a lot higher (3,6♀- 4,0♂) for both workers in Spain and India (3,5♀-3,6♂) than in the Netherlands. In terms of *GE&I*, the most contrasting indicators are *voice & collective bargain*, which is the lowest in the Netherlands (2,2♀-1,8♂) and the highest in India (3,8♀-2,3♂).

⁹ (INS04) said: “in our warehouse, most employees are men because of tough schedules and driving distances.” In The Netherlands, (NLC01) said: “even though technically both men and women could do this job we have never gotten a female applicant.”

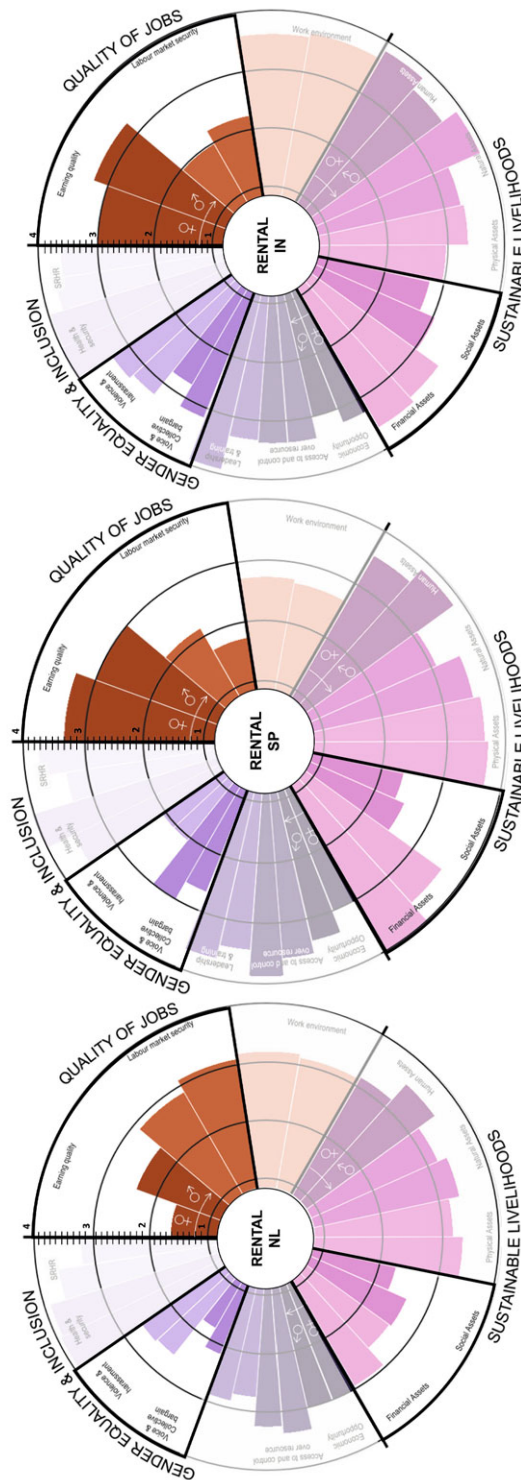


Figure 3.6 Rental's social impacts disaggregated by gender. Relevant graph areas have been highlighted.

These results are surprising as one will consider the Netherlands to provide a much higher *earning quality* and better access to *financial assets*, and better *voice and collective bargain*. However, as explained in section 3.4.2, the strong presence of early startups financially consolidating their business leads to *low earning quality, financial assets and collective bargain*, which are lower than in Spain and India.

Additionally, Rental in these two countries presents more mature startups, financially stable, and more capacity to invest in their workers’ well-being as corroborated by (INS06). Finally, the high *financial assets* score in Spain can also be explained by the fact that most workers in Rental are young, single female workers, who, in the case of Spain, are still living with their parents. According to (INS08), “Rental is the new cool job to have for young, educated women.” This statement seems to be true in the three countries, suggesting that Rental currently benefits mostly white-collar workers.

3.4.3.2 Resale

Resale includes shop manager, shop supervisor, sales, and Repair assistants. Resale platforms include marketing professionals and designer stylists. In India, we also find logistic clerks and technical coordinators.

Table 3.4 Most relevant Resale jobs characteristics per country.

Country	Resale Platform		Resale brick& mortar	
	Majority gender	Job characteristics	Majority gender	Job characteristics
Netherlands	Women	Part-time with salaries around minimum wage	Male immigrants	Full-time
Spain	Women	Part-time	NA	NA
India	Male	30% Part-time	Male	70 % informal

Most CJs in Resale follow the same pattern as in the traditional retail sector. As put by (NLE07), “Companies that produce abroad are occupied with the social impacts of the earlier section of their value chain, forgetting that their retail operation is also characterized with low working conditions and sometimes lack of workers’ rights respect.” They are generally part-time, often short term, and pay just over minimum wage for male and female employees. Here, the work of volunteers and interns is prominent in the Netherlands and Spain. This could be explained because of the large number of NGOs and startups in a consolidation stage. In India, most jobs in Resale are performed by informal

workers. Resale Informal workers represent (70%) of the sample, while Resale startup platforms represent the other 30% of which half are male workers.

Social impacts show contrast among different countries. In The Netherlands, *earning quality* is *medium-low* (2) for both female and male workers, while in Spain and India is *medium-high* (3,0♀-3,3♂). In both countries *Job security* is relatively *low* for India (1,50♀-2,2♂) compared with both Spain (3,3♀-3,2♂) and the Netherlands (3,2♀-3,0♂). Regarding Sustainable livelihoods, while Resale in the Netherlands and Spain scored similarly for all workers in most indicators, the contrast between male and female workers is more pronounced in India. As seen in Figure 3.7, women score lower in *human, natural, physical* and *financial* assets. This can be explained by the lower presence of collective agreements that guarantee higher-than-average working conditions regarding vacation, health, and pension schemes, as corroborated by our interviewees (INE03). Regarding GE&I in India, *voice & collective bargain* are significantly lower for Indian female workers due to the high informality level in the sector and early startups.

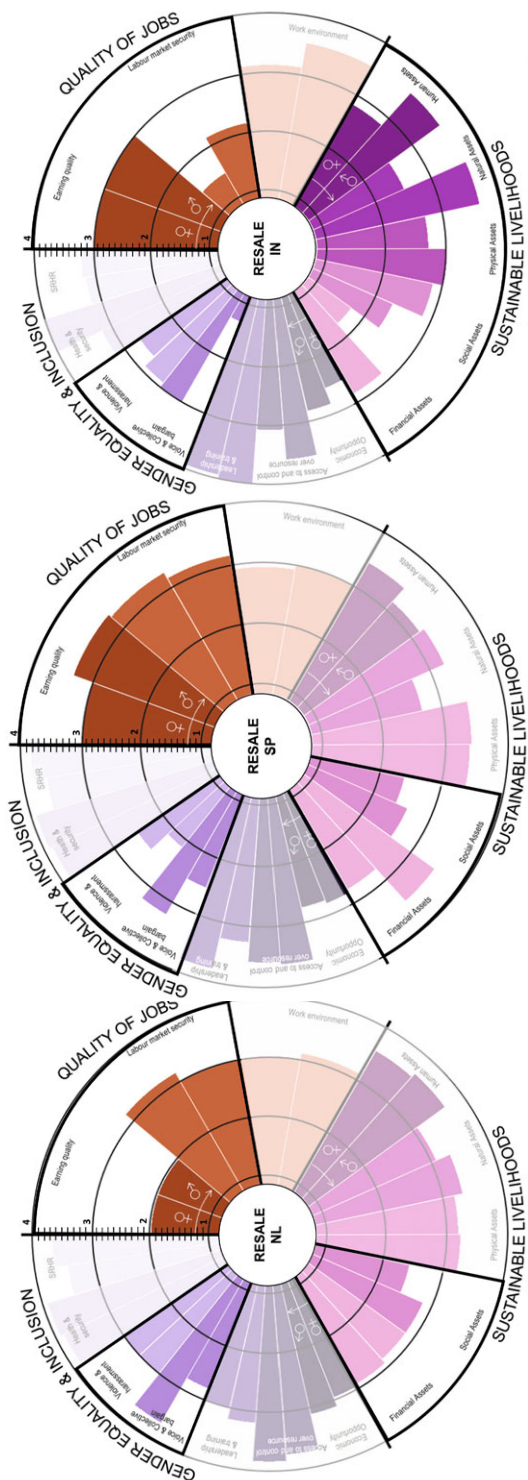


Figure 3.7 Resale social impacts disaggregated by gender.

3.4.3.3 Repair

Repair comprises tailors, designers, sales assistants, and, specific to India, cobblers. Companies, where Repair is performed in-house do not create additional jobs. Detailed characteristics of Repair job can be seen in table 3.5.

Table 3.5 Most relevant Repair jobs characteristics per country.

Country	In-house sales-Repair jobs		Independent Repair shops	
	Majority gender	Job characteristics	Majority gender	Job characteristics
Netherlands	Women (66%)	Part-time with salaries around minimum wage	Male immigrants (67%)	Full-time self-employed
Spain			Women	
India	Male (72%)	Full time (88% overtime)	Males (72%)	Self-employed or informal

When comparing Repair in the Netherlands and India, as shown in Figure 3.8, we see contrasting realities mainly in *earning quality*, *labor security*, *financial assets*, *voice & collective bargain* indicators. In both countries, *earning quality* is closer to the minimum wage (medium-low) and lower for female workers. Although in the Netherlands, the minimum wage is very close to the living wage, it is still considered in the lower pay range of the sector. According to experts in India, female workers earn below the minimum wage, which is insufficient to cover basic needs (INE03). *Labour security* is significantly lower in India than in the Netherlands, while *voice & collective bargain* are the lowest indicators (1,0). Both results can be explained due to the informality nature of these jobs in India. However, in terms of *work environment*, workers in both countries perceived their working environment as favorable (3,4♀ and 3,5♂).

Regarding *violence & harassment*, in the Netherlands, male workers consider that their employers have appropriate policies, while women workers do not (2,3♀ and 3,5♂). In India, this indicator shows score of (3,1♀-3,3♂). These results corroborate our literature findings that *violence & harassment* is still hard to speak about in the TAVC, reflecting broader societal issues in Europe and India (Anderson Hoffner et al., 2021; Naved et al., 2018).

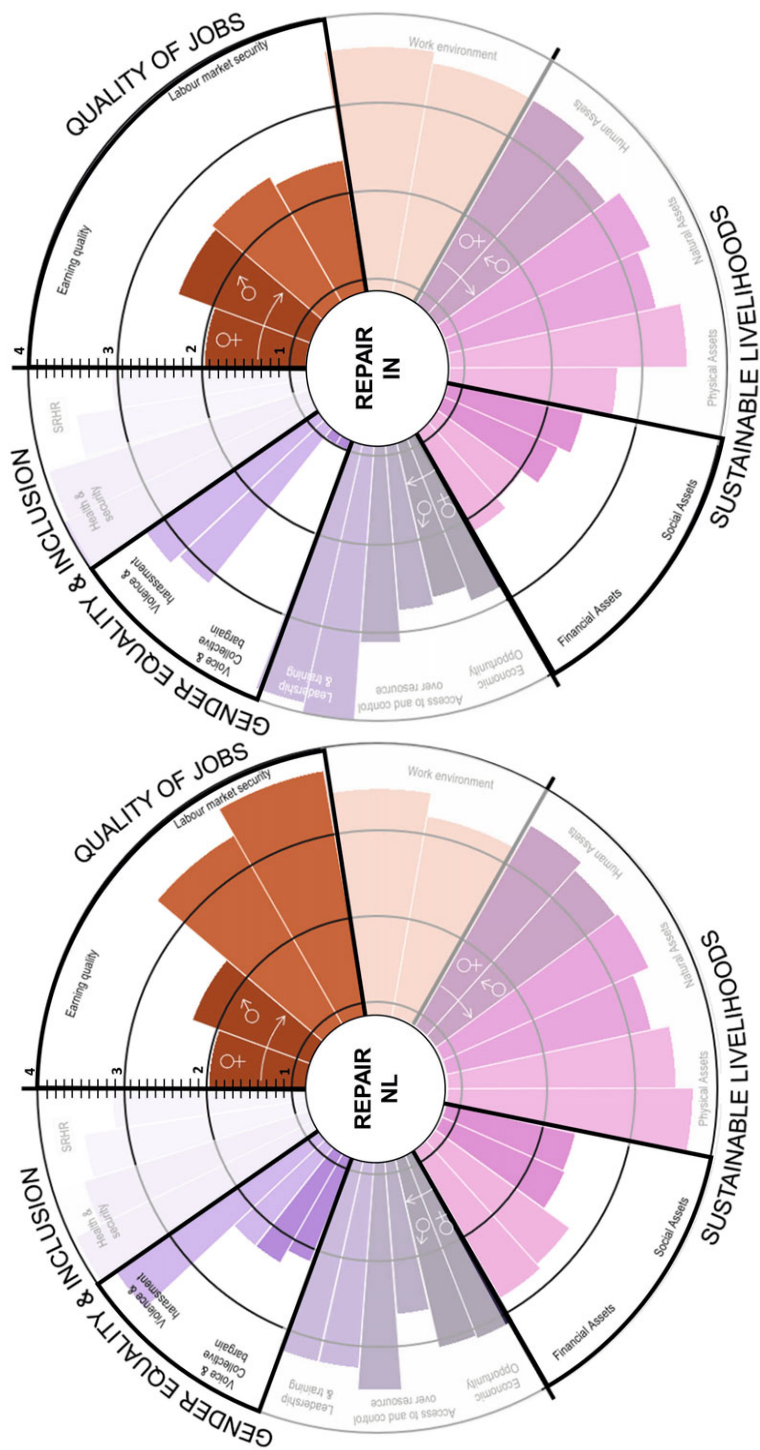


Figure 3.8 Repair's social impacts disaggregated by country and gender.

3.4.3.4 Remanufacture

Remanufacture includes tailors, designers, and sewing machine operators. In Spain, it also includes buyers, managers, and sales assistants, while in India, the sector also employs clippers and logistic clerks (Table 3.6).

Table 3.6 Most relevant Remanufacture jobs characteristics per country.

Country	Machine operator		Tailors	
	Majority gender	Job characteristics	Majority gender	Job characteristics
Netherlands	Women (75%)	Part-time with salaries around minimum wage	Male immigrants (90%)	Full-time self-employed
Spain	Women (78%)		Women (78%)	Part-time and permanent
India	Women (64%)	Full time (88% overtime)	women (50%)	Informal workers

Regarding QOJ, we found pronounced pay gaps between male and female workers in the three countries. As seen in Figure 3.9, male earning quality is 50% higher than females. Also in The Netherlands, 37% of remanufacture workers are divorced women, which adds an extra burden for their family obligations, as they mainly work part-time and make less money. In all three countries, men have the highest paying positions. This is linked to a higher score in financial assets as well. This strongly relates to gendered job segmentation as put by (INS03), "In India, males are the skilled tailors, the pattern cutters while women are often employed in low skilled line-work." In terms of GE&I, while economic opportunity, voice & bargain, and violence & harassment scored medium-high, they scored slightly lower for women workers in all three countries.

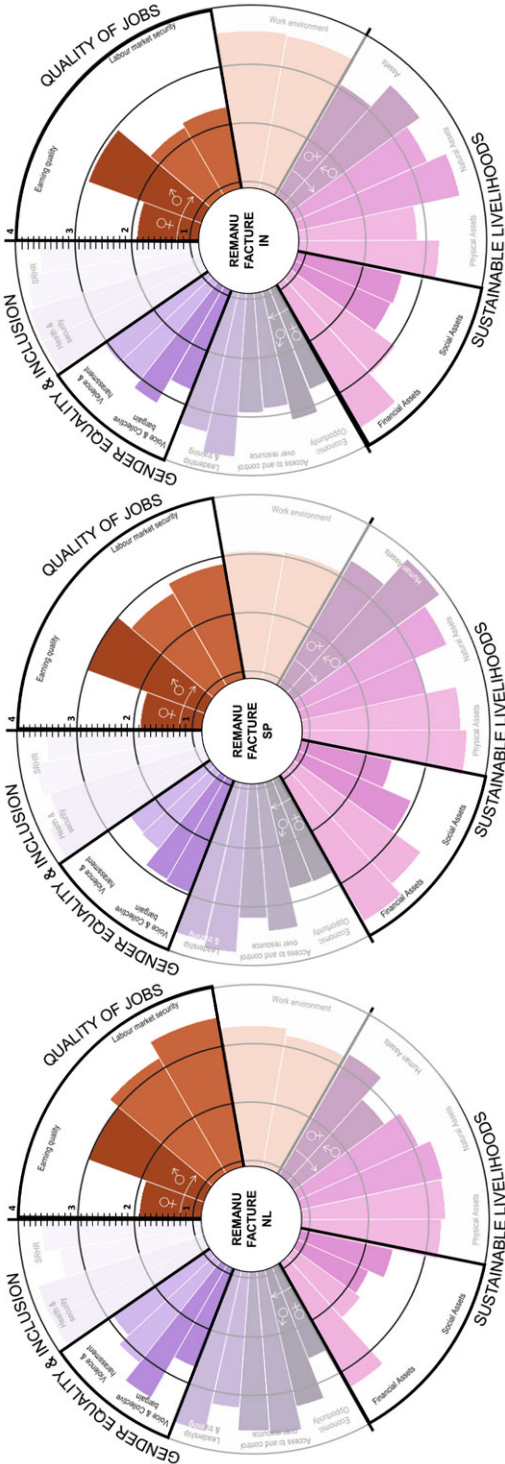


Figure 3.9 Remanufacture 's social impacts disaggregated by country and gender.

3.4.3.5 Recycle

The most relevant jobs in recycling are sorter, logistic manager, logistic clerk, and buyer. Table 3.7 shows the most relevant jobs and characteristics.

Table 3.7 Most relevant Recycle jobs characteristics per country.

Country	Sorters (clipper in India)		Logistic clerk	
	Majority gender	Job characteristics	Majority gender	Job characteristics
Netherlands	Women 67% (60% immigrant)	56% permanent, 66% part-time with salaries around minimum wage	Women 67% (45% immigrant)	56% permanent, 66% part-time with salaries around minimum wage
Spain	N/A	NA	NA	NA
India	Male (100%)	Permanent, full-time	Male 100%	Permanent, full-time

In India, recycling is characterized by a high number of informal workers. However, due to COVID-19, most respondents come from formalized employment. The *earning quality* in the Netherlands is significantly lower for women than for men (see Figure 3.10), the highest-*earning quality* for women in India as most workers are formalized. In terms of *sustainable livelihood*, women have significantly lower *financial assets*, which is explained by a higher amount of family debt and a small capacity to save, as confirmed by workers surveys. Even though the sorting job was mentioned as a pivotal job for the sector (NLC09, NLC13, NLC10), sorters are paid far less than the clerical logistics position, demonstrating the lack of value the recycler position gets. Sorters earn around the minimum salary. However, according to management, sometimes sorters get a bonus for sorting of high quality, but as put by (NLC13, NLC10) “if your bonus relies on the quality of sorted products, and you have bad bags because of dirt or quality of items, your final pay suffers in the end.”

The *sustainable livelihood* dimension is considered *medium-high*. However, the financial assets indicator shows a considerable variation between male and female workers, where *financial assets* show a lack of saving and debt management in the household of female workers. In contrast, access to *financial assets* is the highest indicator for males in India and the second highest for males in the Netherlands, evidencing of higher *economic capacity*.



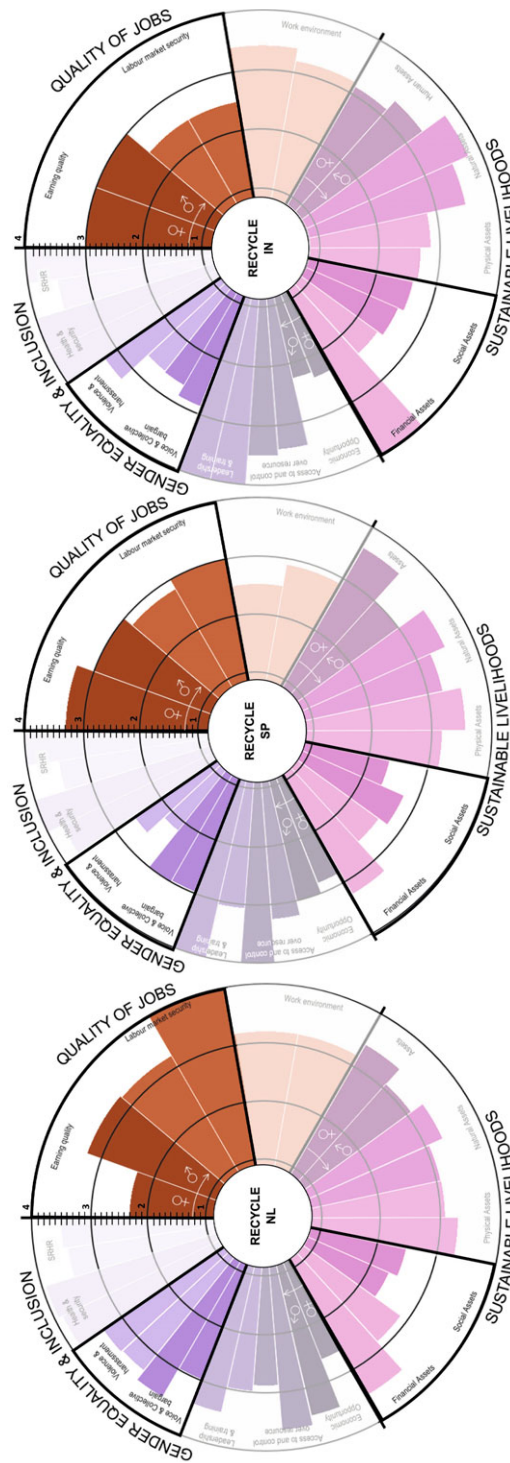


Figure 3.10 Recycler's social impacts disaggregated by country and gender.

3.4.3.6 Intersectionality Analysis

In terms of intersectionality, gender, migration status, language/race, and class-caste intersect in CSs, marginalizing more vulnerable populations. The most vulnerable workers in terms of QOJ, SL and GE&I, are informal workers in Repair and remanufacture, as evidenced by the low earning quality and low SL. However, in our sample, we did not have informal enterprises as presented in (Tucker & Anantharaman, 2020). In the informal category, we only had informal Repair and Resale independent workers. For instance, in India, while dry cleaners and tailors (often males) have predefined rates, the cobbler (informal worker and often woman) is paid per assignment and must negotiate with clients each time.

Moreso, informal women refugees in Resale who often come from a caste, ethnic or religious minorities and do not speak the local language are not even covered by basic national Indian insurance, as corroborated by workers surveys, making them an even more vulnerable worker. Informal women workers in Resale and Repair have greater access and control of economic resources, as they were making financial decisions (autonomy) of their household. They also have a high perception of working conditions as they can decide their working schedules. However, their access to financial assets is very restricted (as their income is very low and they have a very limited capacity to save). So even though their agency and autonomy are higher, due to their low income and low access to labor security, they are the most vulnerable of workers when comparing the different circular strategies in India under the SIAF-CE lens.

According to (INE02 and INE04), there is a need to ensure that circularity benefits both formal and informal workers, especially the unorganized textile waste picker, the most vulnerable workers of all. They have no voice and no negotiation power, so they are exploited by more prominent dealers¹⁰. To reduce vulnerability in informal workers, a transition to formalization should be accompanied by a process in which they are organized (in a community association or a so call informal community enterprise) to have a collective voice that represents them (Tucker & Anantharaman, 2020).

In formalized settings, immigrant workers, especially women, are also prone to salary discrimination for the same job and same years of experience. This was noticeable, especially in a few startups in Spain, where salary scales are not standard, and salaries are negotiated when being hired. In the Netherlands

10 As (INE05) said, "they suffer all sort of social stigmas such as interfamily violence and drug addiction. They are by far the outcast of the system, and if we do not do something to incorporate them fundamentally, there will be the outcast of the Circular Economy too."

and Spain, 'newcomer' workers are served by a well-established network of re-integration social enterprises, which play a pivotal role in helping these workers to enter the job market. However, as (SPC04) said, "the biggest challenge of social enterprises is to continue helping migrants when they find a job because even though they are integrated into the society, they are also excluded from it. As they are relegated to the types of jobs that nobody else wants to do." This situation can create a social trap for these workers. Ideally, circularity will help people gain new skills from which higher salaries and opportunities are present too.

Additionally, there is an apparent asymmetry in how we value professions, which is influenced by gendered cultural norms (Barrientos & Smith, 2007; English, 2013; Van Nederveen Meerkerk, 2018). This is evident in the TAVC, where "work" value is based not on quality but on the title of who performs it. As (SPS07) said, even though men and women tailors do the same job and have the same skillset and knowledge, there are different levels of perceptions of both types of workers. For instance, in the three countries investigated, a tailor is generally male. The position is perceived as a master craftsmanship which is better paid. Female tailors are in Spain considered "dressmakers", they have good craft skills and are paid less than male tailors. Likewise, Repair assistants and cobblers in India are mainly women or people from lower casts working informally and making less money.

Moreover, the same tailor position has a significant earning contrast based on who (which type of company) pays for it. For instance, In India, the luxury Rental sector, where tailors are always male, is where the highest salaries are (even though these tailors are not formally educated). In contrast, women workers in Remanufacturing holding the same skillset and position are the lowest paid. Finally, in the Netherlands, as put by (NLE01), "jobs like Repair and (re)manufacture are not very highly viewed either in a social sense or financial sense. People want to be designers." At the same time, as students today are not taught to put a dress together, there is a current lack of tailor's skills. Interestingly, our results also point out that tailor jobs are currently the most relevant for circularity in all three countries as they are required for Repair, remanufacture, Resale, and even Rental. This situation evidences a deep value gap for the profession, associated with traditional gendered structures of the traditional TAVC, which are also being perpetuated with CSs in the sector.

3.5 Discussion

3.5.1 Social impact of circular strategies

Today, Rental and Resale are the most thriving strategies in the three countries, which depend on a growing local urban middle class with increasing purchasing power and consumer awareness. They also showed the highest number medium-high scores demonstrating a better social impact than other strategies. Additionally, Rental seems to generate more jobs because it incorporates Repair, maintenance, and Resale, representing an opportunity to explore local and regional CE approaches. Nevertheless, according to our findings, Rental, Repair, and Resale share the same characteristics typical of the retail industry, e.g. short contracts, minimum wage payments and sometimes part-time jobs (even for educated workers).

Also, as these circular strategies depend on a high transport logistics online-platform model, there is a growing concern that low social protection might arise, as it has also been observed in the so-called GIG economy (Arnold, 2020; Hürtgen, 2021; Koutsimpogiorgos et al., 2020). Additionally, social issues such as gender gap disparity, poor working conditions and low collective voice & collective bargain can also be observed in Remanufacturing and Recycling CSs. As in the linear TAVC, they also show a growing presence of undocumented refugees or migrant workers.

Tailoring jobs are currently the most relevant for circularity as they are required for Repair, Remanufacture, Resale, and Rental. According to our interviews, immigrants and refugees in Spain and the Netherlands are bringing back these skills and knowledge to circularity, as the offshoring production trend in the industry since the nineties made these skills in the local industry obsolete. However, they seem to have lower QOJ and lower family well-being while they are often stigmatized as low-value positions, as pointed out by (NLE07). This situation reflects the need to increase the professionalization of tailors through technical vocational schools. These schools should include specializations and re-skilling such as dressmakers, menders, remanufacturers, and de-manufacturers.

In addition, a revalorization campaign should be created to de-stigmatize and de-genderize the profession. Such a campaign will promote dignity and value in professions like Repair and Remanufacture. It should have an internal (within companies) and external focus (with potential job candidates and wider society as a whole). Companies' internal campaigns should aim to give these jobs more desirable attributes such as better pay, better contracts agreement with more flexible schedules, and learning opportunities to grow.

The external revalorization campaign should be a joint effort from the sector and employment government agencies showcasing the added value of these professions in vocational training and fashion schools, in career job fairs and on social media. A curated team for Gender and Inclusion should also make sure that the campaign speaks to all types of citizens that are diverse and inclusive in the use of its messages and visuals.

3.5.2 Companies applying circular strategies

Companies applying CSs reproduce the same third-party contracting model as the traditional TAVC. Although outsourcing allows businesses to grow their brand by leaving the manufacturing to others, third-party contractors can only provide basic income and temporary contracts to their workers as they depend on brands orders. This model keeps workers powerless, poor, insecure and vulnerable to all market changes. This was evidenced during COVID-19, when cancellation of orders, lack of payment and illegal firing of employees occurred (Anner, 2020).

Also, although circular incumbents and startups often outsource activities from the same supplier of linear TAVC, allowing them to build a long(er)-term relation, collaborate and substantially improve the suppliers' working conditions, these efforts concern only a small fraction of the industry. They lack a systemic approach where benefits ripple down to the most vulnerable workers in the sector.

Finally, our results show that *labor security* is lower when both informality and startups are present, which is the situation for current CSs in Remanufacturing, Repair, Resale, and Recycling. This point is critical because if these CS increase as circularity become more established, workers' job security and access to unemployment benefits will be affected. In this case impact capital seems to play a role in stimulating positive social impacts as the Indian startups supported by "sustainable ventures capital firms" provided to their employee's permanent contracts and benefits such as transportation, education allowances, pension, and savings through schemes as the provident fund and the (ESI) Employment State Insurance.

3.5.3 CE policy

Circular Economy policies adopted in Spain and the Netherlands have a low social ambition which currently only mention job creation potential. Additionally, these CE policies seem to be disconnected from producing countries such as India. On one side, European CE policy advocates for a reduced demand for primary sources and new products, supported by SMEs and startup European companies with a strong emphasis on "creating local jobs." On the other side,

neither policymakers nor businesses in India seem to be aware of the potential trade-offs, circularity might bring to the Indian businesses and workers, as they are more concerned with addressing production issues. A more global systemic level perspective is needed, connecting stakeholders at local and global realities. This perspective is pivotal for closing different performance loops and ensuring a fair transition.

3.5.4 Basis for policymaker and industry recommendations

For circularity to be genuinely transformational and contribute to sustainable development, it must address several issues:

1. It should have a more substantial social paragraph in its definition, elaborating on the quantity and quality of jobs created, the direct and indirect impact for communities in which those CSs are implemented, and how CS can affect gender and inclusion imbalances. The inclusion of a social perspective should be an effort carried out by policymakers and businesses alike.

2. It should acknowledge the structural imbalances of the TAVC and therefore re-imagine an inclusive circular fashion system aimed at equal opportunities for most disadvantaged workers. This could be accomplished by i) mandatory human rights due diligence, -including the incorporation of workers committees in all negotiation-, ii) privileging more extended contracts (and incentivize them) and iii) requiring companies to extend transparency efforts up to the informal worker by gathering specific gender statistics supported by the NGO working with these communities and promoting the development of plans to incorporate these workers in a more democratic and formal way. As pointed out by several interviewees, businesses should work more integrally with vocational training centers to ensure that workers have the right set of hard skills.

3. Policymakers should ensure the ratification and implementation of international labor standards and develop incentive programs for startups to adopt early-on social and environmental assessing mechanisms. Companies should be required to report on both environmental and social performance of circularity. Additionally, NGOs and trade unions should provide subsidized awareness-raising and training in every company (disregarding the size or type) with a particular emphasis on migrant workers. This will ensure all workers understand their rights, the internal company procedure, and the external normative provision at their disposal regarding violence and harassment, voice and collective bargaining.

4. Coordinated Policy promoting inclusive CE should encompass different governmental bodies at various levels that work within the countries and across the different stages of the TAVC. For instance, the labor and finance ministry

and the ministry of international affairs should work together with the ministry in charge of mobilizing efforts to improve circularity. Ideally, this should be done at municipal, national and European level, coordinating international bodies of the apparel value chains.

We acknowledge that these basis for recommendations, will not radically improve the poor working conditions along the TAVC. We hope that the suggested basis for recommendations, supports the endeavors of all stakeholders to (re) create a sustainable value chain.

3.5.5 Limitations

Research limitations are related to either survey size and population or scope. It is important to note that the social impacts covered in this research are not exclusively attributable to CSs as they are also the result of current national regulations, policies, and cultural/sectoral norms. However, the labor intensity of CSs in the TAVC can further exacerbate current poor working conditions if the uptake of circularity continues to grow in the sector. Taking a worker's perspective meant that survey responses were based on workers' perceptions which could also carry some bias. Additionally, companies provided the logistics and space to conduct surveys, possibly influencing workers' responses to more positive outcomes.

COVID-19 restrictions affected the number and type of workers interviewed. Not all surveys could be conducted in person, and some workers neither had regular access to the internet nor felt comfortable answering personal questions to a screen. Also, not all platform-based Rental businesses participate in interviews or surveys, which might play a role in the low earning quality reported in the Netherlands. In Spain, Repair surveys were insufficient, and it proved impossible to reach informal textile waste pickers in India.

The limited sample size (210 workers surveyed) provided a partial understanding of the challenges and perspectives for workers in the industry.

3.5.6 Future research

This research provided evidence of the current social impacts of CSs in the TAVC, highlighting the risks and trade-offs. Future research should look at how CSs can increase the quality of jobs, workers sustainable livelihood and gender equality in future scenarios where circularity uptake is growing at global scale. This chapter aimed to set some ground basis for recommendations. However more in-depth recommendations both for policymakers and businesses to improve the deployment of more inclusive circular practices in the sector should be the focus of future research.

Additionally, in our sample, businesses carrying a social mission seemed to accommodate better distinct workers' needs. Future research should analyze this further by comparing how different corporate structures and management styles affect the social impacts of circularity.

3.6 Conclusions

This study addresses the lack of knowledge about the social impact of the different CSs implemented in the TAVC. Using a mixed-method approach and a novel social impact assessment framework called SIAF-CEğ, it addresses the social impact of CSs in the Netherlands, Spain, and India from the perspective of workers and different company types.

From a country perspective, the current social ambition of CE is low in all three countries analyzed, and it does not provide any attention for the quality aspect of jobs created. Current circular jobs seem to follow the linear TAVC in terms of behaviors and practices and reproduce the same social imbalances and inequalities we see throughout the TAVC today. *Earning quality* is between minimum and living wages in all three countries, with India having the lowest QOJ. Sustainable livelihood is sufficient in all three countries for male and female workers except for *social and financial assets*, which are lower than the other indicators. While most gender equality indicators score medium-high, these are generally lower in India, especially for *violence & harassment and voice & collective bargain*.

Additionally, this low participation in labor unions and general survey participants disengagement around their collective working conditions, coupled with the third-party contracting model, is worrisome, as it keeps current asymmetrical power relationships among workers and companies along the supply chain. This could be exacerbated if circularity increases without fully addressing this issue.

CSs seem to be at a very early adoption stage for incumbents and startups, with the deployment of CS happening organically. In terms of social impacts, startups show contrasting earnings between men and women, with women earning significantly less. In comparison, incumbent businesses provide medium-high quality jobs and reduce gender gaps. Since startups are driving circular efforts and creating local jobs, it is pivotal to develop incentives to help them strengthen their social impact ambition and social impact in their circular activities.

From the workers perspective, current CSs are replicating the feminization trajectory of the linear TAVC, with women being overrepresented in the jobs with the lowest salary and poorest working conditions from manufacturing to the end-of-life segments. Moreover, decent working conditions for informal workers and migrant women workers are still far off with circular practices employed today in the industry. Overall, women experienced lower social impact benefits than their male counterparts in most indicators across the three countries.

Policymakers and businesses of the TAVC need to strengthen their CE social impact ambition and harmonize policy and strategies along different geographies to minimize trade-offs and safeguard a just circular transition for all.

Finally, this study demonstrates how the SIAF-CE² provides a solution to the lack of gender-disaggregated data in the TAVC. It also provides the basis to assess the social impact of the CE, which allows to understand and minimize trade-offs of jobs in different stages and geographical locations of the TAVC. Moreover, by providing evidence of the social impact of current CSs, it provides basis for industry and policy recommendations.

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“The future isn’t something waiting for us to arrive—it is made, co-created in the now. And if you’re not part of that co-creation, someone else will shape the future instead.”

—Research Participant

4

Transformative Circular Futures in the Textile and Apparel Value Chain: Guiding Policy and Business Recommendations in the Netherlands, Spain, and India.

This chapter is based on Suarez-Visbal, L.J., Carreón, J.R., Corona, B. et al. (2024). Transformative Circular Futures in the textiles and apparel value chain; guiding policy and business recommendations in the Netherlands, Spain and India. *Journal Of Cleaner Production*.

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Abstract

Circular Economy practices are gaining importance in the global textile and apparel value chain to promote sustainability. However, the lack of attention paid to the Circular Economy's social dimension is concerning, given its expected global implementation for 2050. Neglecting this social impact undermines both environmental and social sustainability, perpetuating industry inequalities. To address this problem, this study develops Transformative Circular Futures (TCFs) to inform policy and business decision-making in the textile and apparel value chains of India, the Netherlands and Spain.

TCFs are co-created Circular Economy scenarios that are diverse, systemic, and embedded with social impact considerations. This research employs participatory methods to blend system-change, Circular Economy, social impacts (through a gender lens), and positive desirable futures approaches, resulting in 16 scenarios. The results emphasize the pivotal role of diverse stakeholder engagement in reshaping the textile and apparel value chain towards equitable and transformative Circular Economy futures. The TCFs-derived recommendations to reduce inequalities and improve workers' well-being are critical steps towards a more inclusive and equitable transition to circular practices in the textile and apparel sector. Common recommendations include normalizing living wages for direct, indirect, and informal workers, implementing regulations challenging patriarchy, eliminating gender pay and establishing permanent global committees of social actors. This ensures that social considerations are integrated throughout national and international negotiations within the circular textile and apparel value chain.

Keywords: Circular Economy, systems thinking, social impacts, positive desirable futures, CE transition

4.1 Introduction

The textile and apparel value chain (TAVC) are a complex global system of industries extending over different geographies. It comprises an abundant number of large and small businesses and has been considered one of the most polluting industries (Niinimäki, 2018; Kaplinsky and Morris, 2000; Porter, 1998; WBCSD, 2014). The TAVC employs more than 10% of the global workforce and is mainly characterized by poor working conditions from the extraction stage to the end-of-life (EOL) segment (Suarez-Visbal et al., 2022a). Women constitute more than 75% of this workforce and are over-represented in the most vulnerable jobs (Fletcher and Tham, 2014; Neetha, 2002; Ascoly, 2009). To achieve sustainable development, the sector has seen the rise of Circular Economy (CE) practices (Kirchherr et al., 2017; Repp et al., 2021; Köhler et al., 2021).

However, several scholars have highlighted the lack of policy ambitions and disregard for the social dimension of CE practices within the TAVC, particularly its impact on workers and communities (Suarez-Visbal et al., 2022a; Llorente-González & Vence, 2020; BSR, 2021; Suarez-Visbal et al., 2022b). According to these studies, many prevailing CE strategies emulate the linear value chain model by perpetuating questionable working conditions, low payment, and the feminization of its workforce. These findings indicate that by adopting circularity in the sector, workers and communities are not necessarily better off (Suarez-Visbal et al., 2022a; Repp et al., 2021; BSR, 2021). Such an outcome is problematic considering that sectoral and national plans worldwide are aiming at achieving high degrees of CE by 2050 (De los Rios and Charnley, 2017; Elia et al., 2017; Geissdoerfer et al., 2017; Stahel, 2016; Witjes & Lozano, 2016). Hence, if circularity is perpetuated in its current form without due consideration of its societal implications, the prospect of achieving social sustainability alongside environmental sustainability is at risk. This will inadvertently reinforce patterns of oppression and worsen existing inequalities within the sector.

Studies about the future and how it can affect our present, have been used to influence policy and guide practical action towards sustainability (Andersson, 2018; Candy & Dunagan, 2017; Miller, 2018; Edwards, 2010; Weigend Rodríguez et al., 2019). The interest in future studies has increased significantly in the last few years to guide the CE transition, which, in the context of the TAVC, has resulted in CE future papers such as (BSR, 2021; Oomen et al., 2022; Muñoz, 2009; Tham, 2015; Buchel et al., 2018; Vaccari & Vanni, 2021). However, CE future studies are scarce, poorly integrated and present several shortcomings that should be addressed to support an effective sustainable CE transition (Bauwens et al., 2020; Svenfelt et al., 2019; Dufva et al., 2017). First, most

of these “CE future” studies shared similar characteristics with current CE narratives, as they are also asymmetrical, focusing on the techno-environmental dimension and missing the social one. Second, future CE visualizations fail to incorporate a systems perspective (Pauliuk, 2018; Lacovidou et al., 2020). In addition, authors such as Calisto Friant et al., (2020) refer to the necessity of including alternative ideologies, co-developing methodologies, and diverse voices in the making of CE futures. Finally, most of these studies are euro-centric, lacking the necessary geographical representation of the global south present in the TAVC (Swyngedouw, 2011).

Considering these findings, we need to develop transformative futures, i.e., alternative future scenarios that are system-oriented, socially proactive, desirable, and inclusive (Markard et al., 2012). Only by co-creating such futures are we able to effectively guide and inform policy and business practices of the CE transition in the TAVC.

To fill these gaps, the following research question will be addressed:

How could transformative circular futures inform policymakers and industry to improve the social impact for workers involved in circular strategies in the TAVC?

This chapter aims to provide business and policymakers with recommendations that could improve the present social makeup of the CE in the TAVC. The chapter is organized as follows: Section 2 covers the theoretical background on CE, combining future studies, systems thinking and social impact. Section 3 describes the different methods adopted; Section 4 contains the results of the future exercises in the Netherlands, Spain, and India. In Section 5, discussion, limitations, and future research are addressed; followed by conclusions and implications for research in Section 6.

4.2 Theory

The CE is understood as an economic system which replaces the “end-of-life” concept with circular strategies such as reducing, reusing, recycling, and recovering materials in production/distribution and consumption processes (Kirchherr et al., 2017). It operates at the micro, meso, and macro level to accomplish sustainable development, creating environmental quality, economic prosperity, and social equity for current and future generations’ (Kirchherr et al., 2017, pg. 224). According to Suarez-Visbal et al., (2022a), Suarez-Visbal et al., (2022b), and Battesini Teixeira et al., (2023), circularity in the TAVC is still in

its infancy. It is operationalized mainly through seven circular strategies, often called 'R-strategies',¹¹ depicted in Figure 4.1.

This study uses CE transformation as a point of convergence between CE social impacts, systems thinking, and future studies, as shown in Figure 4.1. Transformative CE is seen as a critical departure point from the status-quo where social impacts and gender inequalities considerations are addressed (left side of figure) and integrated across CE practices on the TAVC (outer circle). Within future studies, the positive desirable future approach (low center of the figure), defines transformative scenarios as co-created with the participation of diverse voices and contexts. This contributes to socially rich sustainability visions of the future. Finally, in system change theory (right side of figure), transformation is considered the deepest level of systemic change, and it is achieved when different system conditions operate simultaneously at different system-change levels. These three dimensions of our Transformative CE lens will be explained in subsections 4.2.1, 4.2.2 and 4.2.3.

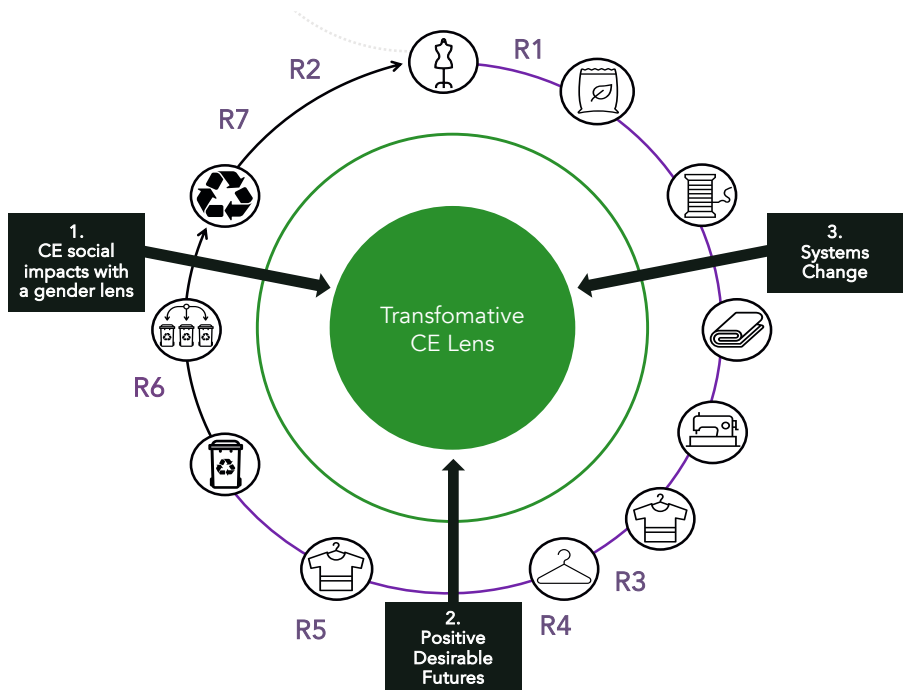


Figure 4.1 Three dimensions of the transformative CE lens used in this research. Source: Own elaboration inspired on (Suarez-Visbal et al., 2023).

¹¹ Which Include R1 Redesign, R2 Reduce/Use or Recover material, R3 Rental, R4 Resale, R5 Repair, R6 Remanufacture and R7 Recycle.

4.2.1 CE social impacts in the TAVC

The TAVC encompasses a variety of workers, from direct employees to entrepreneurs, contractual blue-collar workers, and informal workers (Suarez-Visbal et al., 2022a). Many authors agree that the current application of CE in the sector does not necessarily consider the social bearings of this diverse workforce (Miller, 2018; Ghisellini et al., 2016; Merli et al., 2018). For instance, while Pal, (2017) and Dissyake, (2022) showcase how CE practices in both incumbent and startup companies may result in viable business models, the extent and nature of their social impact on workers and communities is not clear. Additionally, by implementing a framework called *SIAF-CE*¹² Chapter 2 (Suarez-Visbal et al., 2022a); and Chapter 3 (Suarez-Visbal et al., 2022b) asserts that circular jobs tend to emulate persistent structures of the linear TAVC contributing to gender inequality and a lack of workers' participation. Other studies advocate for addressing this gap by incorporating the perspectives of workers into the formulation of CE's social objectives, as well as into the development of programs and policies that will impact them (Suarez-Visbal et al., 2022b; Ghisellini et al., 2016; BSR, 2021; Padilla-Rivera et al., 2021).

Additionally, authors such as Rask, (2022) and International Labour Organization, (2015) emphasize that a transformative way of rebalancing the social dimension of CE in the sector is done by actively addressing critical gender inequalities. This gendered approach is pivotal given that women are disproportionately present in the most precarious jobs. In this regard, the Interagency Gender Working Group, (2012) developed a gender equality continuum (GEC) that showcases how transformative gender programs policies, or processes should look. In the GEC, gender transformative measures seek to redefine women's and men's gender roles and relations to create greater equality. Its interventions target the structural causes and symptoms of gender inequality, leading to lasting changes in people's power and choices over their own lives (Interagency Gender Working Group, 2012). Furthermore, we found four studies that define transformative measures related to the quality of jobs (QOJ), well-being (SL), and gender equality and inclusion (GE&I). These are the Interagency Gender Working Group, (2012) the International Labour Organization, (2017); Beghini et al., (2019) and Mao et al., (2019). Annex 4.1

12 The social impact assessment framework for Circular Economy (SIAF-CE) dimensions are QOJ (quality of jobs) with three indicators (quality of earning, labor market security and working conditions), SL (sustainable livelihoods) with five indicators (social assets, financial assets, natural assets, human assets, and physical assets), and finally GE&I (gender equality and inclusion) with seven indicators (safe & reliable employment, access and control over economic resources, voice and collective bargain, access to health & security, family planning, free of violence and harassment, equal access to leadership opportunities and training).

presents a summary of transformative measures mentioned in these studies that can be applied to the TAVC.

4.2.2 Circular Economy futures through a positive desirable lens

The CE future scenarios found in the current literature use mainly predictive or forecasting tools such as top-down scenario planning for their development (Börjeson et al., 2006; Vervoort et al., 2015). However, this approach is problematic as ‘forecasts present a selected past and often-privileged present onto a linear, unidimensional future’ (McMichael & Sardar, 2000). Although predictive studies can assess the likelihood of occurrence, traditional future studies can also limit the scope of action as they lack the positive, transformational desirability component (Iwaniec et al., 2021).

Several studies argue that CE present and future narratives are still very narrow in their conceptualization, with room for conceptual improvement (Geissdoerfer et al., 2017; Edwards, 2010; Weigend Rodríguez et al., 2019; Bauwens et al., 2020). Most CE futures studies are i) asymmetrical, focusing on the techno-environmental dimension and missing the social one (Tham, 2015; Vaccari & Vanni, 2021; Bauwens et al., 2020). ii) They lack the inclusion of the most marginalized voices, and iii) they lack a diverse geographical scope (Pauliuk, 2018; Lacovidou et al., 2020; Ruiz-Real et al., 2018; Hobson & Lynch, 2016). As the future is not the same for every society or country (Luhmann, 1982) there is not one future, but many futures defined by different geographies (Suarez-Visbal et al., 2022a; Oomen et al., 2022; Swyngedouw, 2011).

Authors such Svenfelt et al., (2019) and Calisto Friant et al., (2020) have already shed light on the need for more alternative visions, although not specifically targeted to the TAVC. Both (Muñoz, 2009) and (Dufva et al., 2017) stressed the need to use co-creation methodologies and diversity in the conceptualization of CE futures. Within the TAVC literature, other studies have started to engage with CE futures and transition pathways (Buchel et al., 2018; Vaccari & Vanni, 2021). However, they all lack a social CE conceptualization and the voices of workers and their representatives. To the authors’ knowledge, there are currently no CE future studies that include TAVC alternative visions that are desirable, socially proactive, and co-created with stakeholders and geographic diversity.

A way to study this type of futures is through ‘*Futuring*’, a branch of future studies that stresses actors’ agency whilst engaging with images of the future to shape possibilities for action in the present (Hoffman et al., 2021). This perspective argues that the dominant dystopian discourse must be challenged by exploring alternative positive visions of different futures (McPhearson et

al., 2016). The theory around positive and desirable futures (PDFs) is novel and positions itself as an option to traditional scenarios. Unlike forecasts, PDFs may not be the most likely trajectory but rather the most desirable one (Iwaniec et al., 2021). They are pluralistic and use diverse participatory approaches.

One of the frameworks to study PDFs is the Positive Future Framework (PFF). The framework distinguishes three scenario types – strategic, adaptive, and transformative – as shown in Table 4.1. Strategic scenarios are often technocratic and use a top-down approach, prioritizing forecasting. Adaptive scenarios are more qualitative and can involve participants. They use forecast and backcasting techniques, yet the outcomes are still based on extending what is possible. Transformative scenarios (TS) are yet to be explored from the realm of CE futures, let alone for the TAVC. However, they serve well the intention to generate a diversity of CE transformative futures. They prioritize participants' agency and co-develop a vision of desirable futures with stakeholders to identify solutions and pathways linking visions to the current state (backcasting). When developing TS, the focus is placed on who is involved in the framing (composition of group guaranteeing a diversity of voices) and how they are involved. This methodology is deliberately sequenced to encourage critical thinking about transformative change (Iwaniec et al., 2021; Wolfram, 2016).

Table 4.1 Types and characteristics of scenarios. Source: Own elaboration based on Iwaniec et al., (2021).

Type of scenario	Strategic	Adaptive	Transformative
Process			
Approach			
Top-down	●	●	●
Bottom-up		●	
Departure point			
Present	●	●	●
Future	●	●	
Technique used			
Forecasting	●	●	●
Backcasting			●
World-making			●
Time-frame			
Short-term	●		●
Medium-term			●
Long-term		●	●
Content	Closest to the business-as-usual (BAU) approach. Small incremental changes.	Explore outcomes and trade-offs of scenario pathways. Push boundaries of what's possible	Radical departures from status quo and plurality of outcomes.
Examples in CE futures literature	Dufva et al., (2017); Tham (2015); Vaccari et al., (2021); Bauwens et al., (2020); Calisto Friant et al., (2020)	Svenfelt et al., (2019) ; Calisto Friant et al., (2020)	NO current literature available

4.2.3 A systems perspective for transformative circular futures

The last angle of our transformative CE lens is the system perspective, a critical aspect for CE, but not applied in CE future studies. This novel approach could steer along more transformative circular scenarios, bringing up front richer, socially bounded, and equitable trajectories (Edwards, 2010; BSR, 2021).

One of the main challenges hampering transformation towards CE is the lack of systems thinking and mental model assessment to address complexity (Weigend Rodríguez et al., 2019; Lacovidou et al., 2020; Iwaniec et al., 2021; Bai et al., 2016). A system change approach creates space for collective wisdom and action to emerge, helping to understand the system in which social problems sit and how it changes (Kelly, 1998). Even though there are several ways to study system change and transitions, this study uses the socio-technical perspective and systems thinking approaches of Meadows, (1999) and Kania et al., (2018) as they are conceptually easy to apply to businesses and organizations.

According to Kania et al., (2018) there are six conditions for system change operating at three levels. The six conditions are Resources, Rules-regulations, Roles, Relations, Power dynamics and Mental models (Maani & Cavana, 2007). The levels of system change (see Figure 4.2) are Structural, Relational, and Transformational. On the structural level, change happens when rules, regulations, and flow of resources are modified. Relational change is guided by the relations between roles and how power dynamics interact. The relational change level is pivotal for system change as we need suitable structures and proper mechanisms to enable interaction and interrelation. The transformational change is the most profound level of system change. At this level, mental models (also called 'mind shifts' or 'narratives') are more present, affecting how we see the world (Meadows, 1999; Kania et al., 2018). Mental models can explain how we make decisions, behave, and selectively filter and interpret information. They can also be elicited in a group setting to create a shared vision for how people would like to experience or change a system. Concurring with this theory, shifts in system conditions are more likely to happen when working at all three system-change levels (Kania et al., 2018).

4.2.4 Theoretical framework

Figure 4.2 illustrates our theoretical framework building up on Figure 4.1, where a transformative CE lens connects positive desirable futures methodologies, social impacts with a gender perspective, and system change. This transformation lens is essential for this research, as it focuses on the who frames change narratives and on the effects that these changes have on workers and communities. It aspires to reconfigure social-ecological systems

towards more 'desirable' futures, in this case, more desirable CE futures. This connection allows us to envision alternative futures of a TAVC that embraces circular strategies while incorporating systemically social aspects that have been neglected so far.

The left side of Figure 4.2 shows the gender transformative social impacts influencing the TAVC according to (Suarez-Visbal et al., 2022a): quality of jobs (QOJ), well-being, and gender equality (GE&I). The positive desirable futures (PDFs) (Iwaniec et al., 2021) (in the bottom-center of Figure 4.2) define transformative scenarios as scenarios that are co-created by diverse stakeholders to produce desired alternative CE futures. The right side of the figure portrays how system change happens and how it is sustained. According to Kania et al., (2018), systemic change is produced when six conditions interact at three levels. At the deepest level (transformational) a shift happens in our set of values, beliefs, and patterns of social behavior. A transformative CE transition depicted in green in the center of Figure 4.2, is the converge point of a CE that embraces socio- gender considerations and uses a system-change approach in the elaboration of transformative scenarios.

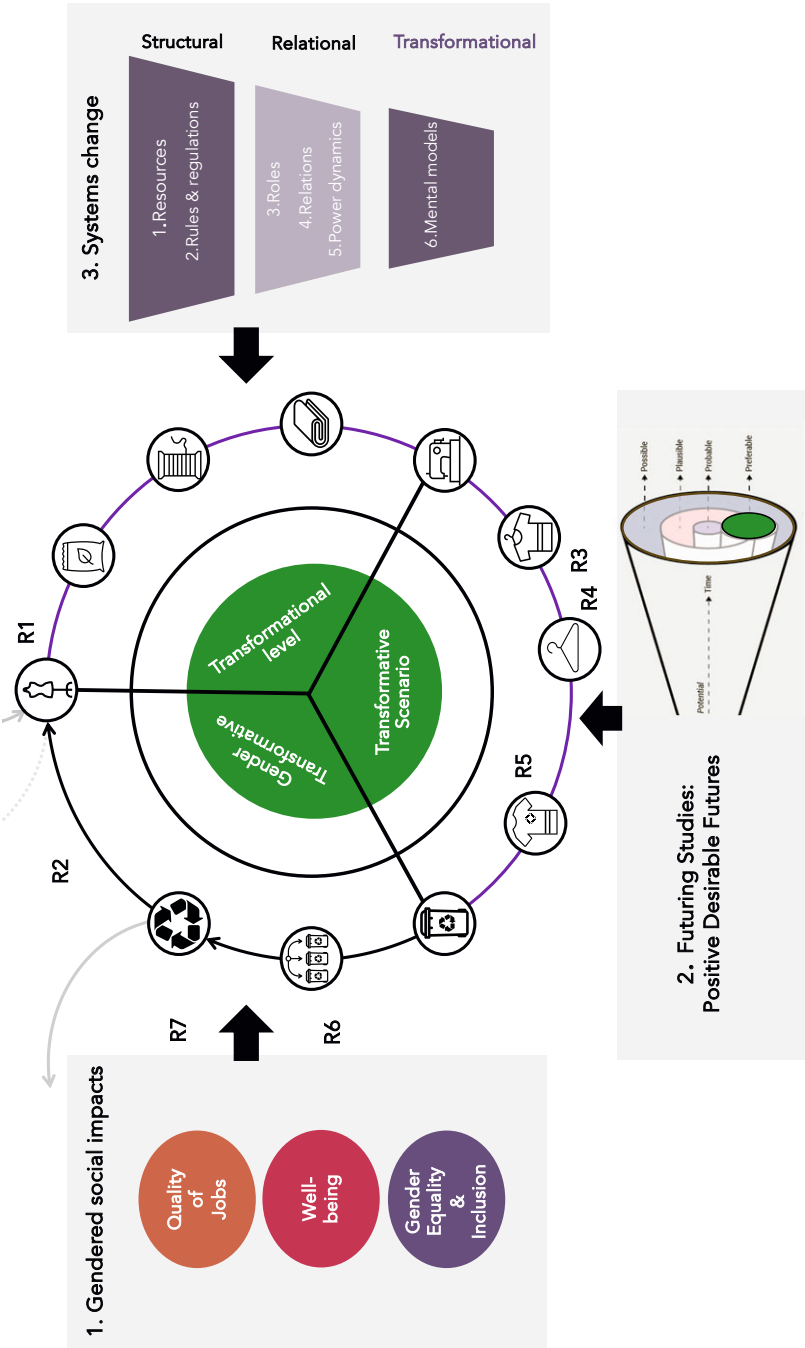


Figure 4.2 Conceptual framework, based on a transformative lens connecting circular future studies, social impacts with a gender perspective and system change. Source: Own elaboration.

4.3 Method

This study adopts a participatory action research (PAR) approach, to co-create transformative circular future scenarios (TCFs). PAR prioritizes the value of experiential knowledge for tackling problems caused by unequal social systems, envisioning and implementing alternatives (Cornish et al., 2023, p.1). This research consists of two phases: scenario co-development and scenario analysis. These phases include the steps indicated in Figure 4.3.

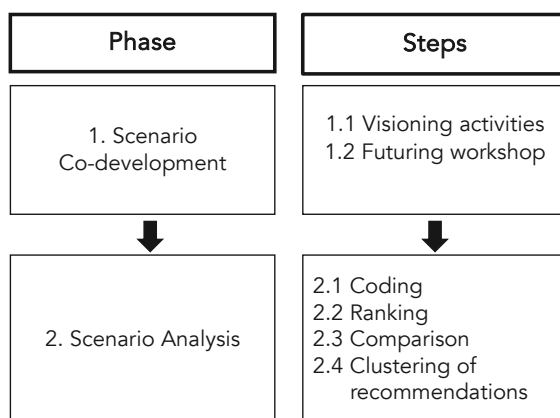


Figure 4.3 Research phases.

Sample

To co-create the TCFs, an inclusive group of stakeholders was selected using the snowball referral method, encompassing senior and entry-level staff in diverse types and sizes of companies of the TAVC, ensuring a heterogeneous sample. The sample includes academics, labor representatives, policymakers, industry experts, and both senior and junior employees of pioneer start-ups, and established businesses involved in circular strategies in the Netherlands, Spain, and India. The Netherlands is chosen due to its leadership in CE implementation in textiles with a goal to achieve 100% circularity by 2050 (Ministry of Infrastructure and Water, 2020). Spain is a major regional exporter of recycled textiles and clothing to other European countries (Carrera & Casas, 2019). India is a hub for raw materials, textiles, and garment manufacturing, with a flourishing circularity culture (BSR, 2020; Kotamaraju et al., 2021).

4.3.1 Scenario co-development

In this phase, we used visioning as a first step to prepare the co-creation of scenarios. Visioning refers to the process of creating a statement about what people aspire to be or to accomplish in the future (Jackson, 2013). To avoid

power dynamics between senior management and entry-level staff, we had two different visioning sessions tailored for them. Senior management staff wrote 'Letters of the Future' (LOFs) (Sools et al., 2015) envisioning a circular apparel and textile value chain in 2050. LOFs are narrative accounts that help to understand internal motivation and desirability aspects in how people construct visions of their world. A total of 80 letters were analyzed using six futures or visions characteristics as coding themes. These characteristics were inspired by Suarez-Visbal et al., (2022a); Iwaniec, (2013); and Candy & Watson, (2015). They include: i) future direction (grow, decline, transform); ii) government roles (weak, strong); iii) technology; iv) localization (local-global or glocal a combination of both; v) sustainability (circular strategies); vi) social impacts as seen in Table 4.2. The use of these characteristics allows the establishment of a base for comparisons and an understanding of what are the most critical aspects when defining future visions.

Entry-level staff created a visioning board inspired by (Jackson, 2013). They imagined being in 2050 and were asked questions to describe their surroundings, situation, and companionship. They were asked to fill in the icons on the individual narrative board from the thing of the future activity (Candy & Watson, 2015), resulting in 15 future narratives analyzed in conjunction with the LOFs. Participants' visioning and LOFs narratives received a code to anonymize them. The first letter refers to the country, followed by the participant number.

Table 4.2 Characteristics of inclusive-future narratives.

1. Direction of future	2. Role of government	3. Role of technology	4. Localization	5. Circular strategies prioritized	6. The social dimension prioritized by SIAF-CE		
Transform	Weak	Low-tech	Local	R1 Redesign	QoJ	Well-being	GEI
Growth			Glocal	R2 Reduce/ use recovered material.			
Decline (degrowth)	Strong	High-tech	Global	R3 Rent			
Control-BAU				R4 Resale			
				R5 Repair			
				R6			
				R7 Recycle			

Source: own elaboration based on Suarez-Visbal et al., (2022a); Iwaniec, (2013); Candy & Watson, (2015).

During the second step of scenario development, two workshop sessions were held in each country. These workshops included 24 participants in the Netherlands, 33 in Spain, and 35 in India, divided into senior management and entry-level staff workshops. An interactive online whiteboard facilitated information collection. In the first workshop the LOFs and the visioning narratives of workers were used as a departure point of inspiration for the first workshops, which resulted in the first draft of 16 TCFs with narratives and visual representations of an inclusive circular industry in 2050. The co-created scenarios were based on the activity of the thing of the future¹³ (Candy & Watson, 2015).

In the second workshop, participants listened to a worker's persona¹⁴ audio. Afterwards, they discussed how this worker's life would be impacted if the group's TCF created in the first workshop was implemented in 2050. This discussion led to an adjusted TCF. The elaboration of the final version of the TCF was completed by employing a backcasting exercise. Backcasting was chosen because it helps envision what needs to be prioritized sequentially to achieve a desirable outcome (van den Ende et al., 2021). Participants were asked to think of barriers and levers at three different stages in time: long term (from 2040 to 2050 years); medium term (between 2030 to 2040 years); and short term (from the present up to 2030). The backcasting exercise together with the recommendations on how to overcome the barriers they envisioned constituted the elements of the final 16 TCFs.

4.3.2 Scenario analysis

The data analysis for future scenarios followed a four-step process using the Positive Future Framework (PFF) as stated by Iwaniec et al., (2021), which is well suited for comparative analyses. The four steps included: coding, ranking, comparing and recommendations clustering. Initially, thematic coding and clustering were performed using Table 4.3.

Inspired by the Gender Continuum from the Interagency Gender Working Group, (2012), Table 4.3 links the three axis of CE transformation (social, system and scenario), and establishes a color-coded ranking going from 'not responsive-structural-strategic' in red, to 'adaptive-relational responsive' in yellow and 'transformative' in green. The ranking was based on the description of IGWG, (2012); Kania et al., (2018) and Iwaniec, (2013). The rows show the types

¹³ Which consisted of having people pick four cards (an action/thing card, a future arc card, a stakeholder card, and a social impact domain card). With these four cards, they created their narrative for an inclusive circular industry in 2050.

¹⁴ A semi-fictional worker whose characteristics were recorded based on previous research in Chapter 3 by Suarez-Visbal et al., (2022b).

of transformation: social dimension with a gender lens in the first row, system-change conditions in the second row, and future visioning characteristics in the third. The columns show the different levels of transformation. After the thematic coding was completed, ranking was performed. Results were plotted on a system vs scenario matrix.

The third step involved two comparisons. The first comparison was a 'within-country' comparison where TCFs within a single country were compared based on their initial coding. The second comparison was a cross-country comparison aimed at identifying commonalities and differences in social impacts, gender-inclusion gains, and system changes.

The final step consisted in grouping the recommendations that originated in the backcasting activities of the TCFs. They were grouped according to the level and type of transformation described in Table 4.3. Five CE experts in each country validated the recommendations.

4.3.3 Reliability and validity

We incorporated the strategies proposed by Morse et al., (2002) to ensure the robustness, validity, and reliability of this qualitative research. To enhance validity, we: (1) used peer debriefing to uncover biases and assumptions; (2) ensured sample representativeness; (3) gathered extensive stakeholder input and triangulated findings with existing literature; and (4) invited participant feedback during a *futuring* workshop. For reliability, we provided a transparent research process, consulted with experts, and achieved consensus on emerging themes. For the evaluation of scenarios, we followed the method of Alcamo & Henrichs, (2008), which proposed evaluation based on criteria relevance (to respond to scientific questions), legitimacy (based on inclusivity, co-creation), and alignment with existing literature and creativity (innovative thinking).

Table 4.3 Scenario and system transformation levels. Own elaboration inspired by the equality continuum from IGWG (2012).

1. Level of gender transformation	Gender negative – gender blind	Gender-sensitive	Gender-responsive	Gender-transformative
Social impact looked through a gender lens as per the gender equality continuum (Interagency Gender Working Group, 2012)	The scenario has a negative outcome that aggravates or reinforces existing gender inequalities and norms or that maintains the status quo and will not help transform the unequal structure of gender relations.	This recognizes existing differences and challenges, but with a low-hanging fruit approach	This considers social dimensions and gender inequalities and responds proactively to overcome and eliminate such inequalities	This attempts to redefine women's and men's gender roles and relations to create greater equality. Its interventions seek to target the structural causes and symptoms of gender inequality, leading to lasting changes in the power and choices women (and men) have over their own lives
2. Level of system transformation	Structural change level	Relational change level	Transformative change level	
The scenario has system-change conditions at different levels from structural, relational, or transformational (Kania et al., 2018)	N/A	The scenario has rules, regulations, and process conditions	The scenario has roles, relations, and power relations conditions	The scenario also has mental model conditions

3. Level of scenario transformation	Strategic	Adaptive	Transformative
<p>Visioning characteristics:</p> <ul style="list-style-type: none">i) Future direction (growth, decline, transform),ii) Government roles (weak, strong),iii) technology,iv) Territoriality (local-global or glocal – a combination of bothv) Sustainability (circular Strategies R1–7),vi) Societal relevance (social impacts as seen in Table 4.1). (Suarez-Visbal et al., 2022a; Iwaniec, 2013; Candy and Watson, 2015)	<p>N/A</p> <p>This covers a few visioning characteristics. (less than three)</p>	<p>This covers most of the visioning characteristics (three or more)</p>	<p>This covers all six characteristics</p>

4.4 Results

Results are organized in four parts: letters of the future (LOFs); transformative circular futures (TCFs) in each country; country comparisons; and recommendations.

4.4.1 Letters of the Future (LOFs)

The six visioning characteristics described in Table 4.2 (future direction, government role, technology role, localization, circular strategies, and the three social impacts) were used to illustrate the different desirable features of the stakeholders' LOFs in Figure 4.4, by using color-coded bubble clusters. These characteristics helped us to understand the commonalities and divergences between different aspects of future visions, and to identify transformative measures that can influence policy or business recommendations.

4.4.1.1 *The Netherlands*

In the Netherlands (see Figure. 4.4), the most popular CS are Recycling (R7), Repair (R5), Resale (R4), and Rental (R3). Given Redesign's (R1) leverage in contributing towards circularity, it is surprising to find R1 as one of the least popular interventions in future narratives. Governments are seen as the leaders of circular transitions. People in the Netherlands imagine contrasting roles in technology. On the one hand low-tech artisanal jobs are valued as an essential craft; on the other, virtual realities feed a high-tech vision. Additionally, entry-level workers' future vision is low-tech, and jobs involving Repair (R5) and Recycling (R7) are prominent.

Regarding social impact, Dutch senior stakeholders exhibit greater concern for QOJ than for well-being or GE&I, while entry workers emphasize well-being. This is seen in future visions where workers' voices are relevant; as (N7) said, "now, in 2050, we are people-driven and not, as it used to be in the past, financially and economically driven."

4.4.1.2 *Spain*

Spanish individual narratives, summarized in Figure 4.4, show an even distribution of transformational, decline, and growth futures. They have a local focus with some glocal (local-global) components. Recycling (R7) followed by Resale (R4) are the most relevant CS. High-tech developments emphasize the benefits of automation. For instance, (S1) states that 'COBOTS (Collaborative Robots) bring out the best of both worlds: enabling fair working conditions while harnessing the talents of people with diverse capabilities. Moreover, while a lingering sense of jobs being taken by automation is noted, its benefits are also highlighted. Robots take many unsecure jobs, replacing the most

dangerous part of them, 'so, in recycling, for instance, there are no fatal accidents' (S17). The government plays a key role in the transition, protecting both QOJ and well-being *with strong* regulation. As observed by (S4) "Today, companies pay a social-security tax for each robot they own. In this way, it has been possible to guarantee a basic salary to any citizen from 18 years old who is working or not" or as (S5) said, "Today all manufacturing is circular by regulation and all these manufacturing processes are audited." Even though senior managers and experts emphasize QOJ, entry-level worker's GEI are the most important social impacts. As (S2) worker said: "We now have a different type of contract, more flexible and based on win-win and trust."

4.4.1.3 India

Indian individual narratives of the future are portrayed by participants as transformational, with an influential role played by the government focusing on a global perspective and relying on high-tech. The most relevant CS are Recycle (R7), Reduction (R2), and Remanufacture (R6), as seen in Figure 4.4. All three dimensions of social impact (QOJ, SL, and GE&I) are relevant. As (I10) said, "companies have invested not only in technologies but in their human resource by providing relevant training to the people involved."

The narratives go from inclusive growth powered by technology, with artisans and informal workers having full access to technology, to growth-limiting narratives. One vision highlights how in 2050, there are apparel factories worldwide producing very little quantity with very high qualities (I3). They employ few workers, but they are paid well. The industry is producing 100% recycled garments, representing one-third of the garments of 2021'. Alternatively, (I23) brings the power of sharing and Rental to transform how businesses function: "The brands' business models have evolved, and everything is offered as a service now. We are not producing a crazy number of garments anymore."

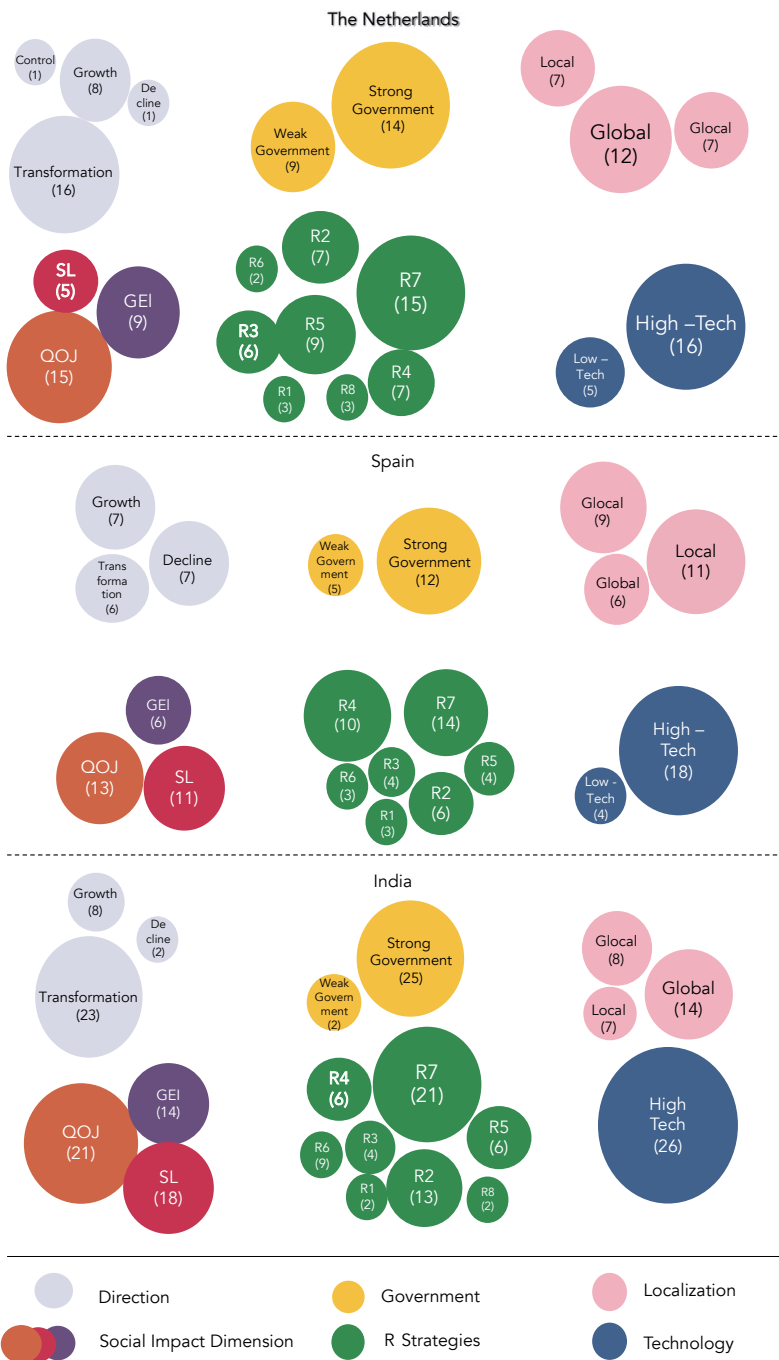


Figure 4.4 Visioning characteristics found in the LOFs regarding future direction, government role, technology role, territoriality, circular strategies prioritization, and social impact dimensions. The size of the bubble corresponds to the number of times. Source: Own elaboration.

4.4.2 Transformative circular futures (TCFs)

TCFs were co-created to represent CE visions of the TAVC that are diverse, systemic, and embedded with consideration for social impact. Table 4.4 includes a summary of the concepts used in all 16 TCFs developed according to the above-mentioned visioning characteristics (Table 4.2). The rows show the TCFs organized by country, and the columns show the relevance of each characteristic, where big dots indicate high relevance and small dots minor relevance (i.e., mentioned only once). The absence of a dot indicates that the scenario does not have this characteristic. The shadowed columns highlight the common concepts among TCFs.

4.4.2.1 Dutch TCFs

In the Netherlands, four TCFs were co-developed. The comprehensive descriptions for each TCF are included in Annex 4.2. As seen in Table 4.4, all Dutch TCFs focus on textile waste Recycling technology and Repair. With regard to localization, TCFs are either local or glocal. All scenarios are high-tech-oriented, where robots and automation play a relevant role by taking away the 'worst' part of circular jobs, such as hard sorting, and by giving room for reskilling, better opportunities, and better pay. Additionally, communities play a pivotal role as drivers of circularity.

Regarding social impacts, some GE&I elements are prominent, such as living wages and the creation of flexible types of employment contracts favoring shorter working weeks (3 to 4 days). They also privilege more family time and well-being. Additionally, they share lifelong professional training and reskilling based on personal growth and career advancement. The most relevant differences relate to the tensions and gaps between the different standards of education and the value of different professions, such as Repair and design. About half of the TCFs advocated stronger relations between education and employment to cope with these tensions and more synergy between social businesses and academia.

4.4.2.2 Spanish TCFs

For Spain's TCFs, the government plays a significant role, followed by companies, and then communities. They all focus on a hyper-local vision, with minimal consideration for the global aspect of the TAVC. All futures are high-tech, and most CS seem to concentrate on Recycle and Rental, although other CS are also mentioned (see Table 4.4). Robotics and automation were mentioned by four of the TCFs, leading to fewer jobs, with higher technical skills and better pay, and a stronger social security system financed partially by robots' taxation on the sector.

Half of the TCFs see a transformational direction, while the other half is split between a growth and degrowth future direction. One group sees transformation as a direct result of our current linear model based on moderated green growth. The second group is based on degrowth, with inclusive and circular narratives around a self-consumption economy where only surpluses are marketed or processed industrially. The community shares resources management with strong principles of co-responsibility, with new forms of production creating better labor relations.

Regarding social impact, there are, on the one side, very progressive and gender transformational features, such as a diversity-of-origin integration policy (to increase diversity and inclusion), focused on physical and emotional well-being, with redistributive retirement and child co-sharing responsibilities. On the other side, there are very strategic measures, with generic rules such as favoring gender equality when subsidizing and appraising. Reskilling and training are also relevant in four of the cases while living wage is only mentioned twice, and a decent, fair, and commensurate salary appears in four TCFs.

4.4.2.3 Indian TCFs

In India, four out of the six TCFs have a local focus, and five have a glocal one (none has a global focus). The most relevant CS are Recycle and Repair, while only one scenario considers Reduction. Social impacts show some similarities among TCFs such as the improvement of the social security system, the provision of universal health for all workers, the strengthening of workers' collective bargaining, informal working recognition, reskilling in digitalization and circularity, and rights-based contracts with fixed working hours.

All TCFs emphasize well-being and more leisure time. In terms of roles, communities, governments, and companies have critical roles in inclusive circular transformations. Half of the scenarios came up with new roles, such as the ministry of 'gamEducation' (education through gamification), the Ministry of Refugees, or "the convener" who bridge the gap between stakeholders. In contrast, instead of adding new roles, the other half emphasized strengthening the relationship through education or through orchestrated production systems with managing entities called DAOs (decentralized autonomous organizations).

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4.4.3 Comparison between countries

Figure 4.5 shows a comparison of all developed TCFs in each country according to their level of system change (structural, relational, transformative) and their gender scenario transformation level (negative/blind, sensitive/strategic, responsive/adaptive, and transformative). The horizontal axis represents the extent of the measures considering social and gender transformation, while the vertical axis represents the system change depth of each TCF. The TCFs included in the green lower-right corner represent the most transformational features from both perspectives. In this light, India has the most TCFs in the transformative quadrant intersecting gender-transformative scenarios and system change transformation. This can be explained by the fact that India bears strong power dynamics from brands to suppliers and suppliers to workers. As India deals with both manufacturing and recycling phases where the most vulnerable positions are for suppliers and workers, they are positioned to win with more alternative, desirable futures. This shows that for genuinely inclusive transformative circular futures, the voice of all stakeholders along the value chain should be heard. Without their voices and views, any circular, inclusive future transition will fall short in its transformative ambition.

Indian TCFs also focused on new roles and relations to safeguard a specific interest group, level power dynamics, and address existing tensions. This highlights the need to develop mechanisms to manage power imbalances, which is also part of the inclusion lens. Finally, at the transformational level of change, additional narratives related to refocusing on values such as respect, tolerance, community knowledge, and valorization of professions are present. Other TCFs also have narratives related to universal design principles, access, and democracy, removing patriarchy as values to redefine rules, regulations, and use of resources. This shows the need to alter our value system concerning people and businesses to avoid patchwork solutions that create temporary fixes in the 'now' while creating problems in the future.

Spanish TCFs had the most gender transformative features (from the social impacts perspective), with rules, regulations, and resources designed to break patriarchy by making mandatory the redistribution of wealth and policies to reduce the gender pay gap and gender inequality. However, they also have two contrasting outliers. In these two groups, the labor representatives' participants were not present, which indicates that diversity and social inclusion voices are critical for more transformative solutions.

At the relational level, Spanish TCFs focused on new roles and relations to safeguard a specific interest group, level power dynamics, and address existing tensions. Other TCFs speak of strengthening existing relations rather than

creating new roles. At the transformational level change, only one TCF had concrete mental model changes and talked about balancing the asymmetry of environmental and social impacts of businesses.

Finally, most Dutch TCFs are at the gender responsive level, where only two TCFs present critical gender transformational elements, such as the gender pay gap and parity in childcare. Also, only half of the TCFs mentioned migrants/refugees and gender gap reduction, two critical aspects of gender inclusion transformation. Regarding system change, most Dutch TCFs are mainly rich in structural and relational level changes, but modest on a transformational level. Only one TCF recognizes that power imbalances will be reaffirmed with more substantial globally operating tech/data companies mainly based in the global north. Mental models from both LOFs and TCFs point to integrating social and environmental considerations into the business model, towards more people-centric models.

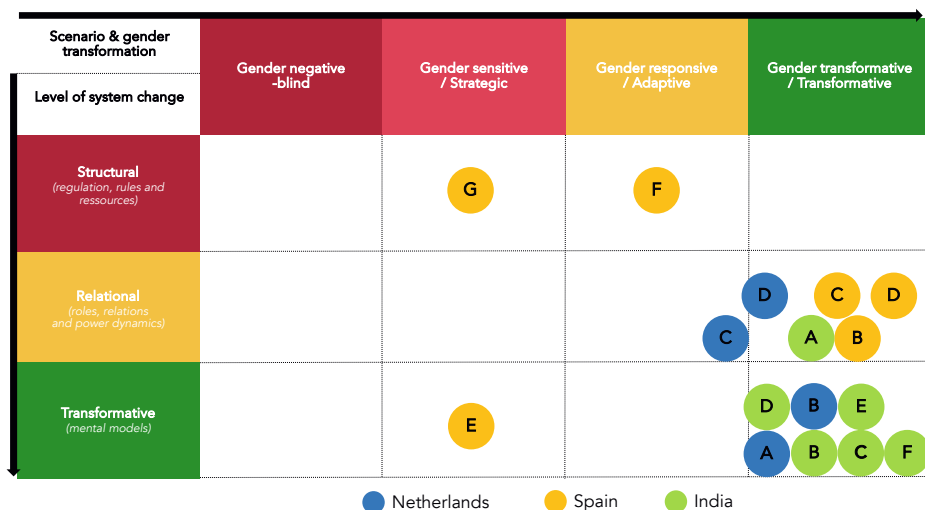


Figure 4.5 Scenario-system matrix: Columns show the level of system change, and the rows show the level of transformation of scenarios. Source: Own elaboration.

4.4.4 Recommendations for businesses and policymakers

The recommendations resulted from the backcasting and further grouping and validations. They were made on the following topics: QOJ, well-being, GEI, and enablers for an inclusive circular textile system. The recommendations were targeted to either businesses or policymakers. Figure 4.6 shows the most transformational recommendations for each country and stakeholder. A complete list of detailed recommendations is presented in Annex 4.3.

As seen in Figure 4.6 recommendations for businesses in The Netherlands regarding QOJ focus on guaranteeing living wages for all workers of the TAVC. In terms of well-being, they aim at reduced working schedules (3–4 days) without payment reduction, freeing workers' time to invest in their personal growth, training for collective bargaining, and family and community time. In terms of GEI, they propose the elimination of the gender pay gap for the same job with similar requirements.

As for policymakers, (see Figure 4.6) the most relevant recommendations address mandatory living wages, the establishment of an upper cap on top-leaders' salaries, and salary redistribution to reduce income disparity. Regarding GE&I, recommendations include revision of immigration policies to consider not only immigrants' and refugees' integration but also their prosperity and their right to thrive. Additionally, they require the elimination of gender income disparity in companies of all sizes. Inclusive circular enablers include tax credits for businesses with staff dedicated to circular jobs, extended producer responsibility (EPR) with global accountability fees, and tax reduction on labor.

In Spain, business recommendations align with those in the Netherlands. However, they are more gender transformational as they seek to break further the patriarchy ingrained in the TAVC. Recommendations include new labor contracts considering well-being and care as rights and incentivizing co-responsible parental leave. In addition to those mentioned in the Netherlands, policymakers' recommendations regarding GE&I include a mandatory 'saving for retirement' fund scheme (co-funded by employer, employee, and government, with special provisions for female workers). Regarding inclusive circular enablers, they propose regulations that require companies to spend a percentage of their profit on reskilling and training for the circular transition.

Finally, in India, recommendations are the most transformational. Regarding QOJ, they focus on revising and updating contracts to be rights-based, including access to medical facilities, pension funds for all workers, and the right to training and access to digital sorting for both formal and informal workers, which is a radical departure from today.

Type of Recom.	Quality of Jobs	Well-being	GE&I	Enabling the system for inclusive CE	The Netherlands	Spain	India
Businesses Recommendations	Guarantee living wages* for all workers of the value chain, including sub-contractors				●	●	●
	Phase-out the "pay per piece" system with subcontractors				●		●
	Updating contracts to be rights-based including access to medical facilities and provident funds for all workers, right to access technology and digital training for segregation platforms						●
	Offer flexible weeks and reduced schedules from 4 or 3 days while keeping living wages				●	●	
	Eliminate gender payment gaps for the same job and requirement levels				●	●	●
	Offer labour contracts including wellbeing and care as rights					●	●
Policymakers Recommendations	Make living wages mandatory for all businesses part of value chain				●	●	●
	Regulations requiring companies to spend a percentage of their profit in workers re-skilling and training for circular transition					●	●
	Revise the immigration policy to consider immigrants' and refugees' integration AND prosperity				●	●	●
	Regulation to guarantee equal maternity and paternity leave					●	
	Require all size businesses to eliminate gender income disparity				●	●	●
	2.0 inclusive-circular economy policy roadmap for the sector that ensure universal health care for all workers, whether registered or informal				●	●	●
	Create EPR with internalized cost of waste management across borders (global accountability fees)				●		●
	Create an automation and robotisation tax that is used to fund inclusive circular transition programs.					●	●
	Provide tax-credits to businesses with circular jobs (repair, rental, resale, remanufacture & recycling)				●	●	●
	Legislations to require business to internalize social and environmental externalities by reporting a triple bottom line for fiscal purposes				●	●	●
	Regulation that reduces taxes on labour and increase taxes on unsustainable resources				●	●	

Figure 4.6 Summary of transformational recommendations in the three countries under study Source: Own elaboration.

With regard to policymakers, the recommendations include the establishment of a 2.0 inclusive-CE policy roadmap for the sector. This should be done by establishing a task force including informal workers and representatives to assist in the transition to the formalization of recyclers and waste pickers. The task force should guarantee a minimum number of hours worked that provides at least a minimum wage. Additionally, for other workers, this road map must ensure reskilling programs for Repair, Recycling, and upcycling to ensure a fair circular transition for workers. Additionally, it should also ensure universal health care for all registered or informal workers. Regarding GE&I, recommendations include support for businesses that provide on-site daycare facilities and support the creation of external daycare facilities via government subsidies.

4.5 Discussion, limitations, and future research

4.5.1 Discussion

All TCFs showed a combination of social impact gender equality measures ranging from adaptive to transformational, which constitute a rich argumentation for policy and business recommendations to be implemented in the short, medium, and long term. These results agree with the findings of the International Labour Organization, (2015) and Gupta, (2000) that state that the melding of social impacts and gender consideration can offer perspectives to rebalance the social dimension of CE. Also, this research shows how co-production methodologies, systems thinking, and future studies can produce a diversity of futures, aligning with the findings and considerations of Iwaniec et al., (2021), Hoffman et al., (2021); McPhearson et al., (2016); and Ogilvy, (2002).

Addressing a noted gap in geographical diversity by Oomen et al., (2022) this study included perspectives from the global south in addition to the European one. This broader representation is critical to the discourse surrounding CE futures, ensuring a more comprehensive and inclusive global perspective.

The process of co-creating TCFs highlighted the importance of privileging the agency of a diverse set of participants. Collaborating with various stakeholders exposed tensions, which were acknowledged and considered in the TCFs. This iterative process, which transitioned from individual exercises (LOFs) to collective efforts, deliberately aimed to incorporate rarely heard voices and recognize power dynamics. As a result, more comprehensive, structured, and inclusive recommendations emerged. This outcome is crucial for the TAVC, as a global perspective informed by diverse stakeholder experiences mitigates geographical blind spots and minimizes trade-offs in CE policymaking and implementation.

This study responds to calls from Weigend Rodríguez et al., (2019), Calisto Friant et al., (2020), and Hamstead et al. (2021) to meld system perspectives in the co-creation of CE futures studies. By incorporating a transversal gender-equality lens, it contributes to the development of more holistic, systemic, and socially rich alternatives for the TAVC. These alternatives offer a pathway towards more inclusive and circular CE futures.

Positive and desirable features were evident in all TCFs, but their positivity did not necessarily imply optimism. Several TCFs contained tensions, chaos, and dichotomies, serving as critical elements that unveiled blind spots and facilitated the understanding of how to manage these tensions. These elements also aided in the development of anticipatory capacity among stakeholders in the TAVC, which was also mentioned by Iwaniec et al., (2021) and (McPhearson et al., (2016) as a necessary step in the transition to a CE, as learning to deal with uncertainties about the future helps us to cope better with tensions.

An intended outcome of this research was to infuse social features into CE future narratives via co-creation with a diverse group of stakeholders (in terms of geography, gender, and roles within the TAVC). Two critical findings emerged from this process. Firstly, the social aspect of CE may not naturally surface but must be explicitly addressed as a goal. Secondly, the full participation of social-impact-driven stakeholders, including workers, labor unions, and social NGOs, proved essential for enhancing the social richness of the TCFs. This underscores the importance of recognizing implicit power dynamics in the negotiation process, emphasizing the need for continuous stakeholder involvement in CE policymaking and business negotiations, which has also been corroborated by the IGWG , 2012; the International Labour Organization, (2017); Beghini et al., (2019); and Mao et al., (2019).

Additionally, four areas of tension in the development of transformative circular futures were found: first, none of the TCFs has a 100% global focus, which is a radical departure from today, considering that the current TAVC is highly globalized. Most Indian TCFs perceived the India of 2050 as a global production hub and a thriving consumer of local circular strategies. In Spanish and Dutch TCFs, some level of reshoring of activities and creation of local jobs is present. In contrast, others speak of a new 'glocalization', with extreme localization coexisting with global activity, with evident power divides. This points towards a desire for closer-to-home circular systems, which will mean a complete redefinition of how the TAVCs currently operate.

Second, there is evident tension around growth and degrowth narratives, which is a necessary conversation currently emerging in the CE debates, as indicated

by Svenfelt et al., (2019), and Calisto Friant et al., (2020) in all three countries, in LOFs and TCFs, we found implicit examples that mention the limits to growth, if not explicitly degrowth per se. Half of Spain's TCFs, one Dutch and one Indian TCF considering some degrowth degree and half of the TCFs going for green growth. For example, some Spanish TCFs indicate a self-consumption economy with strong principles of co-responsibility as new forms of production, bringing more well-being, and indicating that a shift towards more collective ownership could improve inclusiveness. Other Spanish and Dutch TCFs speak about a dematerialized fashion market based on trading consumer experiences in virtual reality, not physical products. In comparison, some Spanish LOFs and Indian TCFs propose regulating a limited number of versatile regenerative certified materials, while others indicate a ban on new clothing production. These narratives propose a CE based on limited resource capacities and a vision of reducing production.

Third, there is a technology-automation tension related to circular jobs. While no TCF mentions low-tech, the LOFs and visioning activities of workers indicate a desire for a low-tech future that brings value to craftsmanship. Some TCFs see automation as freeing workers from the worst part of their jobs, and some see it as a cause for job losses from the most vulnerable workers. In contrast, others see technology for recyclers as an enabler for better lives and a tool to reduce inequalities. Some TCFs resolve this tension by investing in reskilling labor-intensive and high-skills circular strategies, such as Repair and Remanufacture, combined with a more high-tech recycling sector.

Fourth, the diversity of voices involved in the co-production process of the TCFs indicated both tension and mutual understanding of concepts, such as gender equality, transformation, or even living wages. These concepts are often nuanced by self-interpretation that is bound to cultural and social aspects. For instance, around living wages, adjectives such as 'fair' or 'decent' salary were often used in Spanish and Indian contexts, while Dutch TCFs talked mainly about living wages for workers across borders. In India, even some stakeholders called for decent salaries for informal workers while proposing living wages for factory workers.

This highlights power dynamics present in the mental models of some TCFs. In this regard, a cross-border understanding of living wages, inclusion, and gender equality and adherence to this as a principle seems inevitable on the road to a more just and transformative circular transition.

4.5.2 Limitations

Co-creation and diversity were prioritized in this research to increase inclusivity in the TAVC. However, such an approach is also prone to a certain degree of misinterpretation, since concepts such as gender equality, transformation, and even CE may have different meanings in different geographical and cultural contexts. Nevertheless, this risk was minimized by employing local translators and research assistants to clarify concepts and align definitions used in the research. Additionally, even though a diversity of voices from different stakeholders in the TAVC was sought, not all stakeholders participated, and some of those who participated did not participate in all the stages of the research, which means that we could have missed relevant voices, which would have enriched the discussion.

Finally, due to COVID restrictions, most vulnerable workers were not so easy to address, and it was not easy to interact with them, which might have limited the richness of their contributions.

4.5.3 Future research

Future research could focus on the operationalization of the recommendations of this research by different businesses involved with circular practices in the TAVC. It would be helpful to see how these recommendations translate into practice and how corporate systems are hindered or motivated to act upon them. This piloting should ideally be done in various companies with diverse geographical representation.

With regard to CE futures in general, future research could focus on incorporating the vision of other stakeholders, such as consumers. As geographical diversity is still considered a gap in CE and CE future studies, it is worth including other countries from the global south and comparing such results to what has been done so far. As this research focuses on CE futures in the TAVC, focusing on other industries and contrasting findings would be helpful in validating the *futuring* approach presented in this chapter.

4.6 Conclusions, contributions, and implications

This research advocates a socially inclusive approach for co-producing TCFs in the field of CE. Incorporating gender equality, stakeholder diversity, and social impacts is crucial for developing recommendations guiding the transition to a holistic, systemic, and socially rich CE. These principles should be prioritized in CE policymaking and business implementation to ensure comprehensive stakeholder involvement.

To address our research question, we explored conceptual and methodological aspects. Conceptually, the use of TCFs introduces diversity into defining desirable social impacts such as QOJ, well-being, and GE&I. As a result, TCFs provide, CE recommendations for the TAVC that are socially rich. According to our results, Dutch TCFs emphasize living wages and flexible work arrangements, while Spanish TCFs focus on eliminating gender pay gaps. Indian TCFs prioritize universal health coverage, collective worker bargaining, informal labor recognition, and reskilling. A common concept is establishing a global committee of social actors to ensure social considerations in CE implementation processes, regulation, and resources.

Additionally, four critical conceptual tensions emerged: (1) a nuanced tension between 'glocal' visions and local circular systems, (2) we see visions of reduced production imposing a limit on growth within European TCFs that contrast with the absence of such aspects in Indian TCFs, (3) different levels of technology access and reskilling that contrast with craftsmanship, and (4) the need for a cross-border harmonized definition of living wages. These tensions underscore the need to incorporate global south-based partners' perspectives into the global transformative CE roadmap, aiming at a more just circular transition.

Methodologically, a participatory approach was employed, promoting diversity in geography, gender, worker type, and stakeholder involvement. TCFs emerged as co-created CE visions in the TAVC, diverse, systemic, and socially impactful. Future efforts should ensure the participation of social stakeholders including workers, labor unions, and social NGOs in CE policy and industry negotiations at local, national, and international levels.

At a practical level, this chapter provides recommendations for businesses and policy makers aiming to redress the imbalance between social and environmental dimensions and challenging the patriarchal system. These recommendations shed light on the importance of developing harmonized policy roadmaps that include both European and non-European considerations.

Combining desirable futures, social transformation, and systems thinking, this research contributes to the CE and the CE future literature by emphasizing social inclusivity and 'glocal' perspectives. 'Glocal' perspectives nuances should be introduced into CE future discussions, recognizing the need for both localized and globally interconnected circular systems. Practitioners can use these research results to integrate social considerations in CE strategies, tailoring approaches to regions, promoting gender equality, embracing systemic change, and adopting participatory methods. Additionally, *futuring* techniques and gender transformative measures, along with systems thinking, offer valuable

tools for scenario planning. TCFs provide a comprehensive understanding of the social implications of CE practices, fostering environmentally sustainable and socially equitable CE practices.

The authors hope that visualizing more inclusive and transformative futures, including workers' and communities' perspectives, helps rebalance the asymmetry between environmental and social considerations in the conceptualization of CE within the textile and apparel value chain.

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"If we human beings are ever going to live in happiness and harmony with each other and with the natural world, we will have to rethink our economics — starting with downgrading the importance of economics in our thinking."

Donella Meadows

5

Walking the Circular Talk: Analyzing the Soft and Hard Aspects of Circular Economy Implementation of Ten Business Cases within the Textile and Apparel Value Chain

This Chapter is based on Suarez-Visbal, L.J; Rosales-Carreón, J; Corona, B; Alomoto, W; Worrell, E. (2024). Walking the circular talk: Analyzing the soft and hard aspects of Circular Economy implementation of ten business cases within the textile and apparel value chain. *Journal of Cleaner Production*, Volume 476.

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Abstract

Companies in the textile and apparel value chain (TAVC) have been increasingly implementing Circular Economy (CE) practices to accomplish sustainable development. However, CE implementation focuses on the techno-environmental dimension, commonly associated with the “hard side” of businesses. Conversely, the social dimension, referred to as the “soft side” of business (e.g., workers impacts and corporate culture) has received less attention, even though the notion of a Just CE transition is considered critical for the sector. There is a lack of empirical knowledge about how businesses in the TAVC simultaneously manage soft and hard aspects of circularity and what kind of socio-environmental impact they generate. This lack of comprehensive systemic vision creates blind spots, generating unintentional tradeoffs between social and environmental objectives.

Using a mixed method approach that borrows insights from Organizational Management and Systems thinking, this research analyzed both soft and hard aspects of ten circular business cases from three countries. The analysis resulted in a systemic socio-environmental baseline showcasing good practices that could be optimized in terms of material flows, critical social hotspots (e.g., earnings, workers well-being and collective bargain) and system-change conditions for both soft and hard aspects of CE implementation. This research demonstrates that soft and hard aspects of CE are integral components of a comprehensive transformative CE transition framework that facilitates the adoption of more inclusive-circular practices while improving sustainability performance.

Keywords

Socio-environmental baseline, circular strategies, Sustainability performance, Organizational change management, Systems thinking.

5.1 Introduction

The textile and apparel value chain (TAVC) is a complex system involving small, medium, and large corporations spread across various geographies. Due to the rapid growth of fast fashion significant environmental and social concerns have been triggered (Niinimäki, 2018). From an environmental perspective, the TAVC contributes to 20% of global waste (Papamichael et al., 2023), with only 20% of textile waste collected for reuse and recycling (Jacometti, 2019; Papamichael et al., 2023). Additionally, the excessive use of pesticides and chemicals deems the sector as a heavy polluter spanning from extraction to end-of-life (EOL) segments (Cai & Choi, 2020; Niinimäki et al., 2020). From the social side, the sector is also labor-intensive (Linden, 2016), often marked by dubious working conditions, wherein women constitute over 75% of the workforce and are over-represented in the most vulnerable jobs (Ascoly, 2009; Fletcher & Tham, 2014; Linden, 2016).

In recent years, according to studies such as Borms et al., (2023); Henry et al., (2020); and Todeschini et al., (2017), businesses in the sector have embraced the concept of Circular Economy ("CE") to mitigate sustainability challenges (Kirchherr et al., 2017). However, the predominant focus within CE has been on the techno-environmental dimension, commonly associated in organizational management studies with the "hard side" of businesses, which, according to Abdelmeguid et al., (2022); and Goyal et al., (2018), involves optimizing the utility and value of components and materials, closing material loops to reduce waste, and minimizing the extraction and processing of virgin resources (Lenka et al., 2010).

Authors such as Geissdoerfer et al., (2017); Hobson & Lynch, (2016) and Padilla-Rivera et al., (2021) have highlighted the lack of attention to the social dimension of CE, although the concept of a Just CE transition is increasingly recognized as a critical consideration for the sector (Schröder et al., 2020; Sharpe & Martinez-Fernandez, 2021). A Just Circular Economy transition (JCET) emphasizes ensuring good quality employment, robust social protection systems, and poverty reduction while carbon emissions are minimized, and the ecosystem restored (Sharpe et al., 2022b; Swilling, 2019). Current JCET studies refer mainly to the policy side; however, at the business level, JCET approaches are still underdeveloped but deemed relevant to avoid trade-offs between social and environmental impacts. For instance, Bertassini et al., (2021); and Yang et al., (2021) have highlighted the importance of including additional factors such as quality of jobs, workers well-being and gender equality and inclusion (Suarez-Visbal, et al., 2022a). While Chiappetta Jabbour et al., (2019); and Muster & Schrader, (2011), refer to a broader definition of the "soft side

of business” that includes social considerations related to human resources practices and corporate culture.

Additionally, studies such as Ghisellini et al., (2016); Kirchherr et al., (2018); and Padilla-Rivera et al., (2020) emphasize the importance of an orchestrated transformation in companies’ organizational structure, operational processes, and product offerings. However, there is still a lack of empirical knowledge about how businesses’ internal organizational systems are aligned to CE and how they currently assess their circular activities’ environmental and social impacts. This knowledge gap is crucial, as empirical insights can pave the way for establishing a coherent socio-environmental baseline and thus avoid unintentional trade-offs between sustainability objectives. Additionally, as expressed by Dachs et al., (2019); and Strange & Zucchella, (2017) given the global span of the TAVC, identifying social and material-related hotspots across different geographies is imperative (Mishra et al., 2021; Moktadir et al., 2020). A holistic approach is essential for economically viable outcomes that benefit people and the environment.

Therefore, we formulate the following research question:

How do TAVC companies applying circular strategies in different geographical locations manage social and environmental considerations?

By gaining in-depth qualitative insight of business cases, this research aims to:

- i) Understand from a system perspective how TAVC businesses handle hard and soft aspects when implementing circular strategies.
- ii) Establish a socio-environmental impact baseline from which improvements can be developed.
- iii) Identify the challenges and opportunities of inclusive circular process when considering different geographies.

The chapter is organized as follows: Section 2 covers the theoretical background on CE and organizational change management. Section 3 describes the methods adopted. Section 4 presents the results from ten business cases. Section 5 addresses discussion, limitations, and potential directions for future research, followed by conclusions in Section 6.

5.2 Theory

5.2.1 Circular Economy at the firm level in the TAVC

CE has been defined as an alternative to the take-make-waste concept (Homrich et al., 2018). At the firm level, CE central idea is to close resource

loops and optimize resource utilization by designing materials, products and business model that minimize waste (Kirchherr et al., 2017; EMF, 2013). CE accomplishes this by replacing the end-of-life concept with different circular strategies (CS) (Kirchherr et al., 2017). These CS are grouped and categorized in a waste hierarchy called the R-framework (Achterberg et al., 2016), (Urbinati et al., 2017). There are several R-frameworks in literature ranging from 3 Rs (Blomsma & Brennan, 2017), (Sihvonen & Ritola, 2015) to 10 Rs (Reike et al., 2018). In the TAVC most relevant CS are Rethink, Redesign-Reduce, Rental, Resale, Repair, Remanufacture, and Recycle, described in Table 5.1 (Accenture, 2019; Guldman, 2016; Jung & Jin, 2016; Suarez-Visbal, et al., 2022a).

The transition from a linear economy to a CE, require organizations to re-think and restructure their business model, and their organizational configuration, which encompass both internal and external transformation (Hofmann & Jaeger-Erben, 2020).

5.2.2 Circular Economy, organizational change management and systems-thinking

CE is considered a systemic shift towards sustainable development at the organizational level. Organizational change management (OCM) is a field of study concerned with internal organization changes and their triggers (Association of Change Management Professionals, 2019; Rune Todnem, 2005). A recent stream Of OCM called the OCCE (Organizational Change for CE) (Graessler et al., 2024) has emerged to guide the organizational transition to CE planning. OCCE entails multidimensional, holistic, and systemic change that requires fundamental shifts in every aspect of the organization (Eikelenboom & de Jong, 2022; Zollo et al., 2013). It concerns planned 'deliberate activities that move an organization from its present state to a desired CE future state' (Stouten et al., 2018). According to Graessler et al., (2024) OCCE studies analyze change from several perspectives, such as changes from the hard or technical perspective (e.g., products, services, and business models), soft-human related perspective (e.g., behaviors, culture, and mindsets), and organizational changes (e.g., structures, strategies, and capabilities).

Table 5.1 Most common circular strategies in the TAVC.

Circular Strategy	Definition	Place in Value chain				
		Design	Manufacturing	Distribution	Use	End-of-life
R1	Re-design Products designed to extend their useful life by using durable materials so that they can be returned to the circular process. *	●	●			
R2	Reduce Minimize material use, making efficient use of resources to reduce environmental impact. *	●	●			
R3	Rental Payment of a fee or rental to wear a luxury or designer garment. *			●	●	
R4	Resale A strategy to extend the useful life of a product by selling it on both online and physical second-hand sites. **			●	●	
R5	Repair A strategy that seeks to extend the useful life of the product by repairing it at specialized sites or by third parties. **			●	●	
R6	Re manufacture Use of parts of a discarded product for the creation of a new one. Also known as Upcycling fashion, it creates garments with materials recovered from post-industrial or post-consumer waste whose quality is equal or superior to a new garment. ***		●	●	●	
R7	Recycle Includes the entire process from collection, sorting, and recycling, which can be mechanical or chemical, the latter being linked to the recovery of resources or circular supplies. **					●

Source: *(European Commission, 2022), *(Garcia-Saravia Ortiz-de-Montellano & van der Meer, 2022), **(Ellen MacArthur Foundation, 2017); **(Guldmann, 2016); *(Accenture, 2019); ** (Lacy et al., 2014), *** (Reike et al., 2018); *** (Dissanayake & Sinha, 2015).

5.2.2.1 *The hard aspects of CE at the business level*

From the hard aspect perspective, OCCE studies are concerned with technical and quantitative attributes, including systems, tools, technology, and policies (Abdelmeguid et al., 2022; Lenka et al., 2010). External barriers related to hard aspects of CE have been extensively documented. These include regulatory barriers and a lack of financial incentives to support the CE transition (Pheifer, 2017; Vermunt et al., 2019). They also include market issues related to the viability of circular business models due to raw and secondary material scarcity (de Jesus & Mendonça, 2018), lack of standardization of secondary materials, high investment costs, limited financial resources, and technological barriers (Guldmann & Huulgaard, 2020).

Although less explored, Internal aspects have also been studied. For example, studies such as Goyal et al., (2018); Jun & Xiang, (2011) and Van Berkel, (2010) explored the introduction of renewables, improvement of material intensity, and a high-efficiency rate of closing material loops by reducing the output of waste at different production stages. In contrast, others have explored implementing circular business models and designs (Rouvin et al., 2016).

As argued by several authors such as Kirchherr et al., (2018), Padilla-Rivera et al., (2020), Prieto-Sandoval et al., (2021); Stouten et al., (2018); Wiesner et al., (2017); Ghisellini et al., (2016) and Murray et al., (2017), CE transitions at the business level require social changes to address sustainable development holistically and to generate internal CE uptake by employees.

5.2.2.2 *Soft aspects related to circularity and social considerations toward a Transformative CE*

Within the OCCE perspective, CE practices' soft aspect (or the social side) is subject to various interpretations. Some studies refer to internal aspects such as employees and human resources (HR) management practices (Muster & Schrader, 2011). Others like Chiappetta Jabbour et al., (2019) refer to green HR initiatives¹⁵ aiming to enhance sustainable manufacturing practices and to improve employees' work-life balance. Such initiatives include eco-design, CE skills, incentives, and health and safety programs (Chiappetta Jabbour et al., 2019). For others like Stouten et al., (2018), Bertassini et al., (2021); Cameron & Quinn, (2011) and Sarja et al., (2021) soft aspects refer to corporate culture, values, and behaviors and their adaptation to organization's vision and mission (Wiesner et al., 2017). According to Bertassini et al., (2021) related to circularity,

¹⁵ Green Human resources refer to human resources practices that support sustainability goals within the company (Chiappetta Jabbour et al., 2019).

critical components of a CE corporate culture include CE skills (enhanced through training); CE capabilities and competencies of the team.

Additional studies such as Glewwe, (2014); Rubery, (2019) and Sharpe et al., (2022a) support the notion that alongside functional aspects such as tasks, responsibilities, and number of positions created, a more personalized focus on the well-being of workers, their families, and communities is essential. Acknowledging gender gaps in wages, growth opportunities, and promotion practices, and incorporating gender and inclusion considerations into human resource policies is paramount for rebalancing the social dimension of CE in the sector¹⁶ (Ascoly, 2009; Fukunishi et al., 2013; Hale & Wills, 2008; Prakash & Dr. Paterok, 2021). These considerations are critical in the TAVC, given its pronounced feminization¹⁷ Furthermore, in Chapter 4 Suarez-Visbal et al., (2024a) present critical recommendations for TAVC companies to increase social impact and circularity in the sector¹⁸, by addressing both CE's soft and hard aspects.

Finally, other studies include in the soft aspects organizational changes related to corporate strategy, (Svensson & Funck, 2019) and organizational vision (Zollo et al., 2013), that require analyzing different organizational levels processes and structures (Scarpellini et al., 2020; Zollo et al., 2013). However, according to Graessler et al., (2024), OCCE research lacks attention on systems *and metrics* aspects to understand and assess the CE transition at the organization level. Furthermore, they also highlight a lack of research focusing on the sustainability impacts CE generates at the organizational level. Supporting this gap, other authors such as Korhonen et al., (2018); Kumar & Anbanandam, (2020); Muster & Schrader, (2011) and Piecyk & Björklund, (2015) argue that both hard and soft aspects should be addressed simultaneously to avoid trade-offs.

This brings us to the usefulness of melding systems thinking with OCCE studies to analyze how companies address the socio-environmental considerations of their CE implementation. Combining OECE with systems thinking allows for a deeper understanding of the multiple organizational changes at different levels while shedding light on environmental and social dimensions.

16 Gender transformative initiatives seek to redefine women's and men's gender roles and relations to create greater equality.(Interagency Gender Working Group, 2012)

17 A term used to signify that women are disproportionately present in the most precarious jobs (Suarez-Visbal, Rosales-Carreón, et al., 2022).

18 According to (Suarez-Visbal et al., 2024), a transformative CE is socially bounded and systemic, aiming to reduce environmental impact while improving its social impact for workers and communities.

5.2.3 Systems-Thinking and CE at the organizational level

Systems thinking provides a holistic view emphasizing interconnectedness and interdependences of different organizational aspects that hinder or enable CE change. This perspective helps to understand how changes in one part of the organization can influence the entire system to achieve more sustainable outcomes.

A systems-change model that serves this purpose is presented by Kania et al., (2018). It identifies six conditions operating at three system levels that enable socio-economic and environmental change. The system levels are structural, relational, and transformational. The system-change conditions are:

- i) Rules & Regulations (including internal policies and practices)
- ii) Resources (including financial and non-financial ones)
- iii) Roles (that enable and oversee the application of the policies, such as human resources managers, corporate social responsibility (CSR) agents, or operational managers)
- iv) Relations (defined as the quality of connections and communication amongst existing roles)
- v) Power Dynamics (the distribution of decision-making and authority, both formal and informal) (Wallace & York, 2020).
- vi) Mental Models include behaviors, values, shared beliefs, and mindsets in the organization (Alm & Jönsson, 2014; Cameron & Quinn, 2011; Sarja et al., 2021).

Alignment and interconnected operation of these six conditions are crucial for the emergence of effective system change.

5.2.4 Theoretical framework

Figure 5.1 illustrates our theoretical framework, where CE practices are examined from a OCCE lens considering hard and soft aspects at the business level, combining elements from Bertassini et al., (2021); Suarez-Visbal, et al., (2022a) and Kania et al., (2018) discussed in 5.2.1 and 5.2.2. On the left side of the framework, the *soft-social aspects* include dimensions of workers' social impacts such as quality of jobs (QOJ), well-being, and gender equality and inclusion (GE&I). These dimensions are based on the Social Impact Assessment Framework for Circularity (SIAF-CE²) (Suarez-Visbal, et al., 2022a). Soft aspects also include human resources management practices and organizational culture. On the right side, the *hard environmental aspects* involve technology, resources, and infrastructure which are essential for achieving efficiency in circular practices. Three material impact indicators are highlighted: the influx of new and secondary materials, their recirculation through internal or external value chain collaborations (utilizing open or closed loops), and waste reduction.

At the center of Figure 5.1, we find critical conditions according to Kania et al., (2018) to facilitate system-change. We argue that these conditions encompass both *soft* and *hard aspects* of the CE transition. System-change conditions at the structural level, include policies, internal regulations, procedures, and practices interconnected to both human resources and operational management. Roles, relations, and power dynamics are found at the relational level, while the transformational level (which refers to the corporate culture includes values, behaviors, and mental models prevailing in the organization. By employing this framework, we can establish a comprehensive socio-environmental baseline for companies implementing circular strategies.

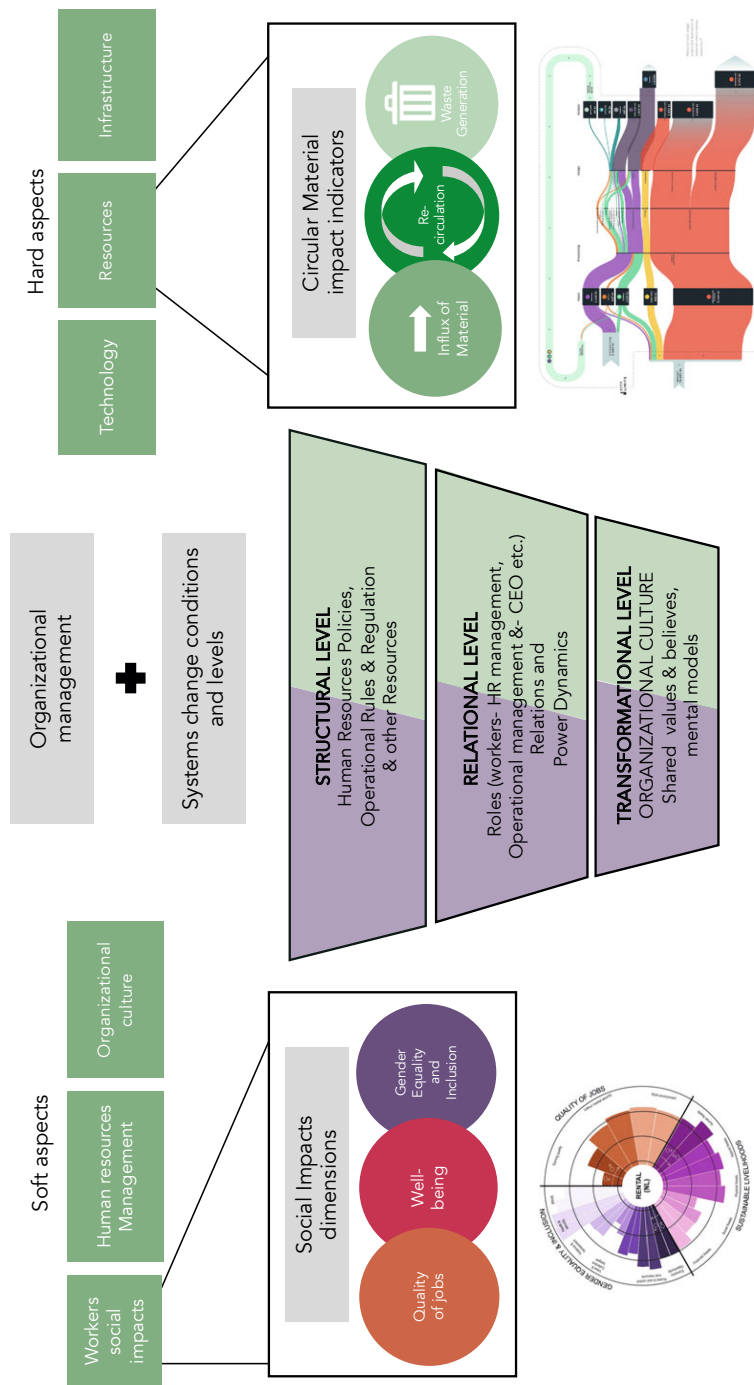


Figure 5.1 Theoretical framework illustrating soft and hard aspect of CE at the business level analyzed from an organizational management systems-change approach (including social and material flow impacts). Source: Own elaboration based on (Bertassini et al., 2021; Kania et al., 2018; Suarez-Visbal et al., 2022a).

5.3 Method

This mixed-method research analyzed ten circular business cases in three countries. It followed 5 steps as shown in Figure 5.2. It collect and analyze both quantitative and qualitative data related to soft and hard aspects of organizational system and socio-environmental impacts.

5.3.1 Sample

A sample of ten companies was selected using a snowball referral method, encompassing diverse companies (in terms of number of employees, CS, maturity and geographical location). Selection included start-ups and established businesses operating in the Netherlands, Spain, and India. Also, the pool of companies had participated in previous studies on the social impact of circular strategies in the sector (Suarez-Visbal et al., 2024b). The business cases were chosen to represent diverse conditions of circular companies along the TAVC.

A minimum of one company per CS and value chain (VC) segment was required to ensure a heterogeneous sample¹⁹, for the purpose of business case comparison. VC segment included Manufacturing, Distribution, and End-of-Life. Three companies were based in the Netherlands, two in Spain, and five in India. These countries were selected because they play a relevant role in the TAVC regarding circular practices. Spain is a major supplier of recycled fibers, fabrics, and clothing to the rest of Europe (Caritas, 2021) p.18. India is the fifth largest exporter of sustainable and recycled textiles and apparel globally and an important textile recycling hub (BSR, 2021; Kotamaraju et al., 2021). The Netherlands has several CE pioneering companies in the sector; it is close to becoming the second European country to have an extended producer responsibility (EPR) scheme for textiles and has a goal to have a 100% circular textile sector by 2050 (Bąkowska, 2023; Government of Netherlands, 2016; Kirchherr et al., 2018; Van Rompaey, 2019).

In Figure 5.3, each company is represented by a color-coded circle and a letter corresponding to the business case; (A-E for India, F-G for Spain, and H-K for The Netherlands.) The circle also indicates the size of the companies in terms of number of employees, the VC segment where they operate and the CS that they have implemented. The arrows represent the movement from one stage of the value chain to another. The reverse arrows indicate that the end-of-life segments are connected again with the manufacturing stage in circularity, bringing recycled content in.

¹⁹ A VC segment (VCS) is a defined value chain stage: extraction, manufacturing, distribution, or distribution end of life (EOL).

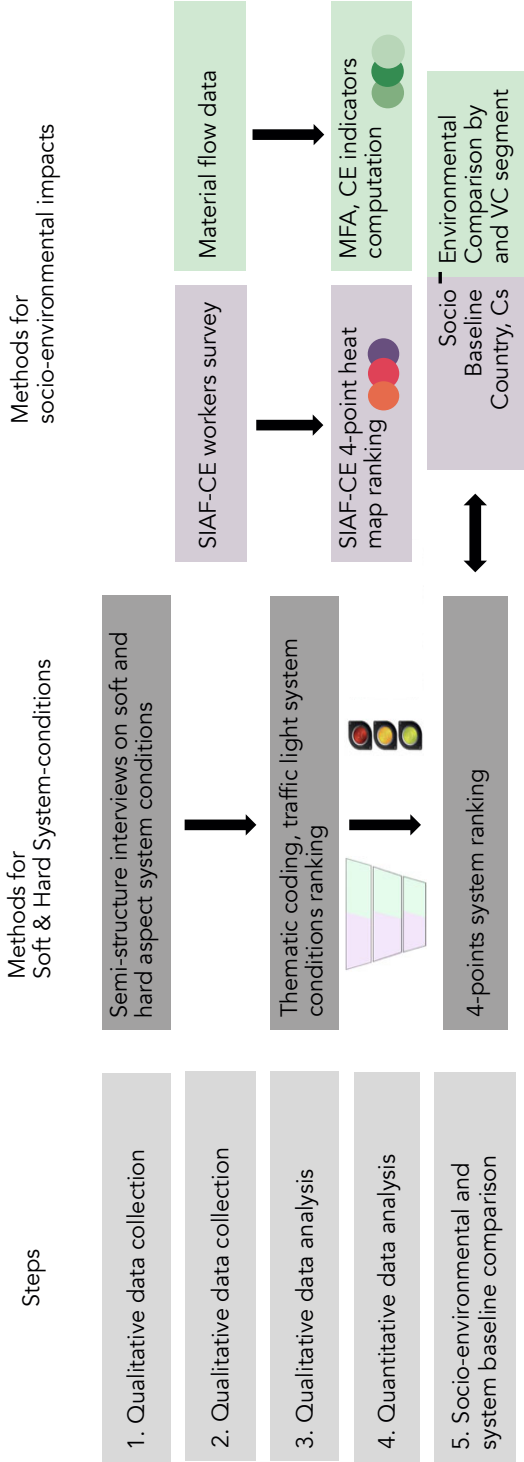


Figure 5.2 Phases, data collection and analyzing methods.

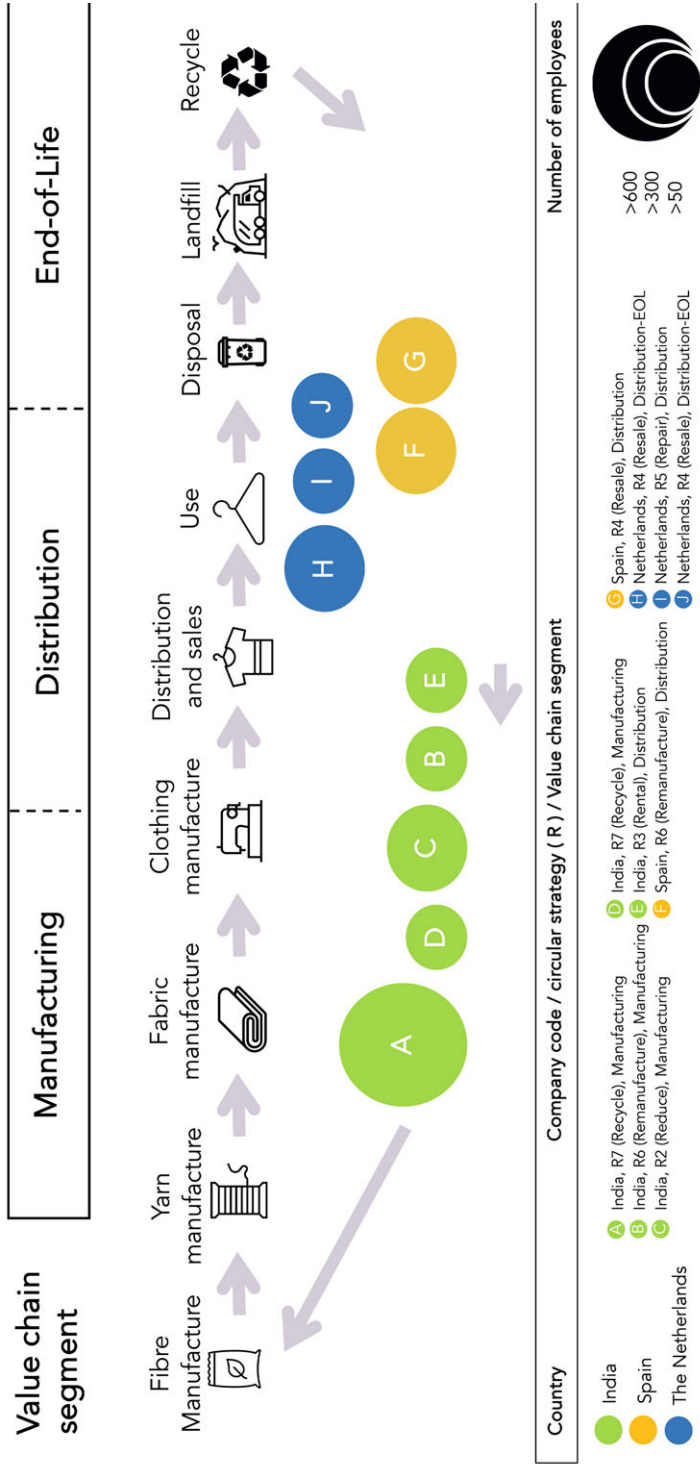


Figure 5.3 The ten Business cases indicated with circles organized by size, country, circular strategy, and place on VC segment. Source: Own elaboration.

5.3.2 Critical research steps

Step 1: Qualitative data collection

Qualitative Data for social impacts and material flows was collected using i) semi-structured interviews with the CEO, CSR agent, and HR manager. The semi-structured interviews were based on the approach followed in Chapter 2 (Suarez-Visbal, et al., 2022a) same questionnaire and protocol were used. Details of the semi-structured interview guide and questions can be found in Annex 5.1. The covered topics included existing policies, programs, and perceptions of management around the quality of jobs, workers' well-being, and gender equality and inclusion, as well as current circular practices. A total of 20 semi-structured interviews were performed in person or via Microsoft Teams.

They were confidential, anonymized, and lasted around 45 min. They were conducted in English, Spanish, Dutch, Hindi, and Arabic. They were recorded, translated to English when needed, using micro-soft teams' translation service and transcribed using otter.ai software. They were conducted from September 2022 to December 2022.

Step 2: Quantitative data collection.

Worker's data was collected through the *SIAF-CEQ* surveys developed by (Suarez-Visbal, et al., 2022a), who had developed a framework that was operationalized, validated and tested with 60 businesses. Surveys comprise 90 questions (85 multiple-choice and five open-ended questions). Of these 90 questions, 28 referred to socio-demographic factors, 27 to the Gender equality and inclusion (GE&I) dimension, 19 to Well-being, and 16 to quality of job (QOJ). In total, 132 surveys were conducted. Surveys were personal, anonymized, and confidential. They took around 30 to 40 minutes to complete.

Material flow data was inspired on Gao et al., (2021) approach and collected using a pre-set Excel spreadsheet (see Annex 5.2). It contained the material input (detailing product types, quantities, material purchase frequency,) material output and waste generation for each company's top 3 best-selling products. The year (2022) was used as a reference year.

Step 3: Qualitative data analysis

Qualitative analysis followed thematic coding and comparison. The semi-structured interviews were coded following the analytical framework explained in section 5.2.4. We identified system-change levels (structural, relational, transformational), the six system-change conditions present (rules, resources, roles, relations, power dynamics and mental models (corporate culture), and social impact dimensions as shown in Figure 5.1. Coding was done manually

by one researcher in an excel spreadsheet. When new concepts emerged that did not fall under the predetermined themes, new codes were created.

The system-level conditions were compared using a traffic light ranking. This method was privileged as it makes measure more intuitively understandable and indicates a relative performance (Thøgersen & Nielsen, 2016). In our traffic light red indicated lack of attributes related to system-change conditions and this is considered a challenge, yellow indicated that some attributes were in place (not a challenge but also not a priority), and green indicated that most attributes were in place, and it shows a good practice.

Step 4: Quantitative data analysis

The quantitative data on soft aspects were analyzed following the SIAF-CEQ methodology described by Suarez-Visbal, et al., (2022a) in Chapter 2. The data was incorporated into a Microsoft Excel database, categorizing responses by gender, roles, company, circular strategy by VC segment, and country. Responses based on sixteen composite indicators (annex 5.3) were aggregated per indicator (using a simple average) and then ranked on a 4-point color coded Likert scale as shown in Table 5.2.

The resulting numerical scale was used to illustrate and facilitate comparison. The ranking system assigned red shades to the most critical challenges (scores between 1.0 and 1.9), indicating high priority. Orange shades were assigned to significant challenges (scores between 2.0 and 2.6). Yellow shades indicated presence but not priority challenges (score between 2.7 and 3.3), while green shades indicated no significant risk, reflecting good practices (3.4 and 4.0). The survey's internal consistency was validated with Cronbach's alpha method shown as reliable.

For the hard aspect, a Material flow analysis (MFA) was used to quantify material flows in the selected companies. An MFA systematically accounts for the flows and stocks of materials within a given system (Brunner & Rechberger, 2004). It helps companies identify priority inefficiency areas, commonly called hotspots (Barthel et al., 2015; Millette et al., 2019). MFAs were performed with the top three selling products per company (Müller et al., 2014).

Table 5.2 Scale to rank soft and hard system conditions and the indicators of the SIAF-CE[†] adapted from (Suarez-Visbal, et al., 2022a).

4-Point Likert scale		Numerical scale															
Ranking scale for Earning quality (SIAF-CE)	1	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
	Below poverty line	Between poverty line and minimum salary															
Social Impact (SIAF-CE) Indicators	1	Most critical challenge															
		Minimum wage															
		Between minimum wage and living wage															
		Significant challenge															
		Living wage															
		Challenge but no priority															
		Average median salary sector															
		Good practice															

Additionally, based on Moraga et al., (2019), three material impact indicators were calculated using the following formulas:

$$i) \text{ Use of reused material (\%)} = \frac{\text{total use of secondhand material (in kg) in 2022}}{\text{total material input (kg) in 2022}}$$

$$ii) \text{ Use of recycled material (\%)} = \frac{\text{total use of recycled material (in kg) in 2022}}{\text{total material input (kg) in 2022}}$$

$$iii) \text{ Waste generation (\%)} = \frac{\text{total waste generated material (in kg) in 2022}}{\text{total material input (kg) in 2022}}$$

Recirculation was not a formula per se but was estimated based on the number of times each product or material was recirculated on a close loop (same industry before being discarded). This information was validated during interviews.

Total textile waste means “materials deemed unusable for their original purpose by the owners” (Polajnar Horvat & Šrampf Vendramin, 2021). *Reused material (or product)* means that the material is used for its intended purposes in its original form over multiple cycles (Ghisellini & Ulgiati, 2020; Yawar & Markku Kuula, 2021). *Total recycled materials* are fibers (or fabrics) derived from previously used or discarded textiles. These materials are processed and transformed into new textile products. A Sankey diagram was created for each company, showing the material hotspots of the selected product lines (Annex 5 4).

Step 5. Socio-environmental and system baseline comparison

Merging the different outcomes of step 4, we compared the SIAF-CE² results, MFAs, and three material impact indicators across different countries, Circular Strategies (CS), and Value Chain (VC) segments, as illustrated in Figure 5.3. This comparison process involved identifying social and material hotspots, as well as analyzing commonalities and differences in organizational systems. By doing so, we established a socio-environmental baseline analysis, which simultaneously examined the socio-environmental systems of businesses and their corresponding socio-environmental impacts. This baseline analysis allowed for a comprehensive comparison of businesses’ socio-environmental performance across various dimensions.

5.4 Results

Results are presented by the hard and *soft system-change conditions* existing in the companies, followed by the respective environmental material and workers' social impacts as shown in the conceptual framework (Figure 5.1). Lastly, the socio-environmental baseline is displayed.

5.4.1 Hard aspects

5.4.1.1 Organizational system

Table 5.3 illustrates the organizational system-change conditions related to *hard-environmental* aspects at the three system-change levels (structural, relational, and transformational). The table organizes the findings per CS, VC segment and country. The first (structural) level includes environmental policies, circular training programs, and circular indicators. At the relational level, the roles of eco-designers (i.e., designers with a circularity approach), CE managers and the internal or external relations were considered as indicators of network collaboration for circularity. At the transformational level, values, behaviors, and corporate mental models related to sustainability or circularity were analyzed. Table 5.3 uses a color-code where a red shade is associated with the absence of an attribute, yellow presence of some attributes, and green presence of most or all attributes, as explained in section 5.3.1.

At the manufacturing segment most common CSs are Reduce, Remanufacturing, and Recycling. While half of the companies use more than one CS, only one CS is considered as the core monetary driver. This is relevant because other CS could be articulated within the business and value model and generate additional economic benefits.




No company provides circularity training, which is critical to ensure the adoption of circular practices on the production floor. As stated by manager B: "If Circular training is only reserved for the design department of a brand, the manufacturer does not know how to optimize the process and become more competitive." This is relevant as it indicates that circular practices are currently replicating the same production patterns of traditional linear production, where the design process is reserved to the brand only (Gereffi & Memedovic, 2003). Most companies in this segment use technology to optimize production and enable circularity. However, waste is not measured because it is not seen as a value-added commodity, as stated by several managers in Spain and the Netherlands.

Additionally, in terms of roles, no company in the VC segment has eco-designers, despite Redesign being one of the most relevant strategies for circularity. Finally, although all companies collaborate with external stakeholders, few collaborations are used to directly enable circularity. In the Distribution segment (represented by four companies in Europe and one in India), the implemented CS are Rental, Resale, Repair, and Remanufacture. All companies combined several CSs, in which only one is part of business model and while the other hardly generate any economic compensation. About half provide circularity training. None use technology to leverage circularity, while half have performed environmental assessments (such as LCAs) and calculate sustainability indicators like water use or CO₂ emission reduction. However, the outcome of these analyses is not directly linked to any specific circular practice. Half of the companies have eco-designers in place, and circular collaborations are used specifically in this segment to drive circularity.

Companies in the distribution-EOL segment (mainly present in the Netherlands and Spain) use Resale as their main CS. Repair and Remanufacture are secondary CSs and are not monetized. Most of these companies do not offer circularity training, which if offered, could help monetized CSs and improve set-skill of employees and adoption of CE practices (Chiappetta Jabbour et al., 2019). These companies do measure the amount of waste generated, but not in a disaggregated way, making it hard to establish what part of waste could be reused by other industries. Some use technology to drive efficiency and leverage circularity. None have conducted environmental assessment before. Finally, half of these companies have an eco-designer or circularity related role, and most have active collaborations to enable circularity.

Table 5.3 Circularity's hard system-aspects disaggregated by CS, VC segment and country. Source: Own elaboration.

System Aspects				System change Levels	Relevant environmental aspects	System change attributes	R2-Reduce	R3- Rental	R4-Resale	R5-Repair	R6-Remanufacture	R7-Recycle	Manufacturing	Distribution	D-Eol	India	Spain	Netherlands
HARD SYSTEMIC ASPECTS							CE System attributes											
STRUCTURAL LEVEL							More than 1 circular strategy in place											
							Circularity training											
							Circular Objective or KPI											
							Certification of Recycled or others											
							Waste measurement											
							Circular Infrastructure											
							Have performed LCA or MFA											
							Technology to improve CE in place (Sorting machine etnl)											
REL. LEVEL							Eco-designer in place											
							Have active CE collaboration in place											
CORPORATE CULTURE							Sustainability mind set											
							Staff- sustainability understanding of job											
														</				

 All attributes are present
 Some attributes are present
 All attributes are missing

5.4.1.2 Material circularity indicators and impacts

Table 5.4 illustrates different CSs and their circularity indicators. It also shows the most wasteful process that resulted from MFA analysis. Using a traffic light system, the darker green indicates the best performance and the red the lowest performance. As seen in this table all CSs use more than 85% of circular material input. As Repair uses little material, it only generated 1% of waste. However, 50% of the actual Repairing material is discarded as waste because the Repairing process is not optimized for material recovery.

The Reduce CS produce on demand and is, in principle, the most waste-efficient strategy, as the use of technology has helped to minimize waste on pattern and on cutting, which are the most wasteful processes of the manufacturing segment. Rental is the CS with the highest closed-loop material recirculation and the one that integrates the most CSs (Rental, Repair and Resale), leading to a low waste generation of 9%.

Recycle uses a 100% of circular material input, with 86% coming from reused material and 14% from recycled material re-integrated into the system. It has the highest generation waste percentage of all CS followed by Remanufacture and then by Resale. Most of this waste is produced during the pre-sorting processes needed for Resale, Remanufacturing, or Recycling because input materials need either considerable cleaning or are too damaged to be reintegrated in the system. However, it is critical to note that this waste is already considered discarded material when it enters the sorting process, hence, the companies applying these CSs are technically not generating more waste, but rather reducing the amount of existing waste.

Figure 5.4 compares the circular material input (biomaterial, reused and recycled material) and waste generation by VC segment and country. According to this figure, all companies use almost 100% of either reused material or recycled material as input, as this is inherent to their circular model. The highest amount of waste is produced in the manufacturing segment, followed by the distribution-EOL segment.

The Manufacturing segment uses the highest input of both recycled and reused material from open-loop process. For instance, post-consumer plastic bottles, post-consumer cotton waste and discarded plastics bags are used as input for the manufacturing process. Most waste is generated by the Indian businesses; however, they are the only companies incorporating recycled material input as most manufacturing of fibers and fabrics happens there. Currently, the Spanish businesses are producing the second highest amount waste, which shows a critical hotspot.

Table 5.4 Circularity indicators per circular strategy. Source: Own elaboration.

Circular Strategy		Reduce-R2	Rental-R3	Resale-R4	Repair-R5	Remanufacture-R6	Recycle-R7
Influx % of new and second-hand material	% Bio-material	100%					
	% of reused material		89%	100%	98%	84%	86%
	% of recycled material					8%	14%
% Waste generation	% of waste generated	7%	10%	17%	1%	23%	46%
Recirculation	# of times product was recirculated	0	9	2	2	2	3
Most wasteful process		Cutting and then QC	Re-used Clothing inventory dead stock	Presorting, sorting	Cutting	Pre-sorting washing cutting	Sorting, cleaning cutting

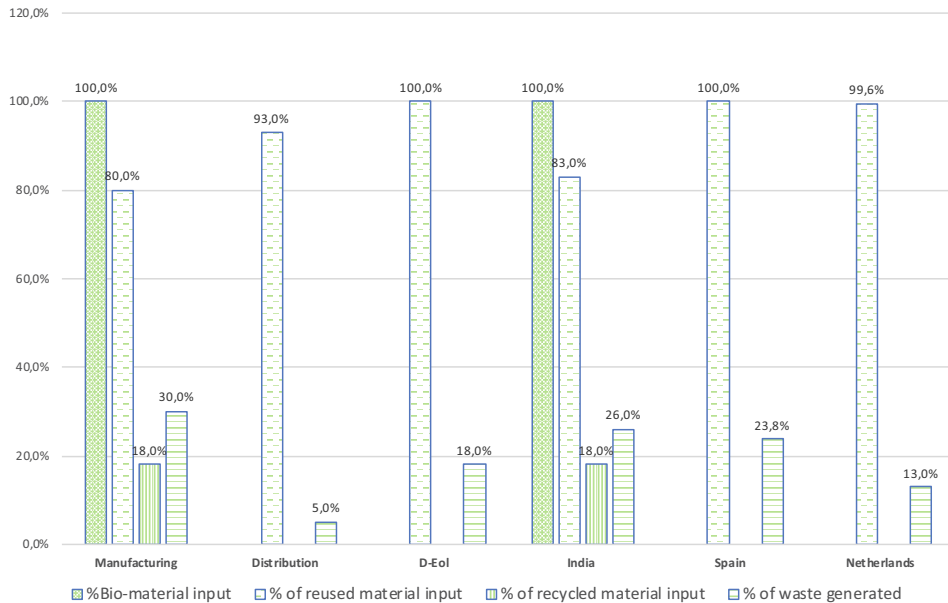


Figure 5.4 Comparison between circular indicators by value chain Segment and country. *Source: Own elaboration.*

5.4.2 Soft aspects

5.4.2.1 Organizational system

Table 5.5 provides an overview of the organizational system related to soft social aspects. It shows the three levels of system change discussed in Section 5.2.2 and the presence of attributes such as job quality (QOJ), worker well-being, and gender equality and inclusion (GE&I). It categorizes findings by value chain segment and circular strategies, employing the same traffic light system as in 5.4.1.

At the structural level, Table 5.5 specifies attributes such as human resources policies (e.g., open salary policy, internal promotion), practices (e.g., flexibility, trainings), and relational elements (e.g., collaboration between human resources and sustainability manager). Additionally, at the relational level, we find roles like well-being, diversity and inclusion (DAI) agents, and the existence of collaborations supporting employees' well-being (e.g., collaboration with municipality or NGOs). The transformational level encompasses mission, values, and initiatives supporting either the well-being of vulnerable populations, or the use of justice and fair-trade principles.

As shown in Table 5.5, the Reduce CS shows the most critical challenges in policies related to salaries, internal promotions, and training. However, Rental, Remanufacture, and Recycling, also experience the absence of open salary policies, while Repair lacks equal salary practices and incentive programs.

The workers' well-being dimension from a system perspective reveals multiple hotspots across most VC segments and CSs, encompassing deficiencies in well-being programs, incentives, transportation and childcare support, personal growth opportunities, and flexible schedules. Recycling is an exception, exhibiting no significant hotspots in this regard. Furthermore, the absence of gender equality and inclusion policies is common across different VC segments and CSs, with an overall deficiency in anti-discrimination and anti-harassment policies. Gender equality training is predominantly present in Recycling and Remanufacturing, possibly influenced by audits recommendations or by the companies' missions aligned towards women's empowerment.

At the relational level, and across VC segments and CSs, the absence of specific roles for gender equality and inclusion is noted. Adherence to labour agreements is only present mainly in European companies implementing Repair and Resale while non-existent in India or in the manufacturing VC segment. Overall, there is a minimal representation of workers as evidenced by few companies having workers' committees or unions.

From a corporate culture perspective, some inconsistencies between intention and practice are present across countries. Although companies implementing CSs define themselves as sustainable, the social aspect of sustainability is less present in their practices, such is the case for Remanufacture, Resale, and Repair. For instance, while companies in the distribution segment employ the most migrant workers across countries, they are the ones lacking most anti-discrimination policies, and workers well-being programs.

Additionally, across all VC segments, women workers seem to be earning less than their male counterparts for the same job performed (see Table 5.6), with several companies are lacking a policy of salary parity. Corroborating this point manager (G) in Spain said, "we want to strive for parity, and though it has not been the case in the past, we are now putting a salary parity program in place."

Furthermore, it seems that Indian companies implementing CSs follow several prevalent practices and behaviors of traditional manufacturing companies. For instance, as in the traditional linear production system, they hire temporary workers on contractual or piece-rate terms (Lazear, 2000; Lazear & Shaw, 2007; Lollo & O'Rourke, 2020). Three different managers reported that migrant workers prefer open contracts with the most cash-in value which also aligns with a preference from companies to work in this manner. As manager (E) said, "working with migrant workers implies they come and go, so it is easier for us to work this way" and (C), "as orders from brands are not steady, we prefer having a flexible workforce for peak production."

Table 5.5 Soft organizational system-aspects disaggregated by CS, VC segment and country. Source: Own Elaboration.

System Aspects	System change Levels		Relevant social considerations	System change attributes	Circular strategy												VC Segment			Country		
	CORPORATE CULTURE	REL. LEVEL			Gender Equality and Inclusion Practices	Workers wellbeing	Quality of Job	R2-Reduce	R3- Rental	R4-Resale	R5-Repair	R6-Remanufactu	R7-Recycle	Manufacturing	Distribution	D-Eol	India	Spain	Netherlands			
SOFT SYSTEMIC ASPECTS												STRUCTURAL LEVEL										

This reliance on a flexible workforce contributes to a lack of worker representation and further underscores negotiating salary parity which reinforces companies' interests. Additionally, some Indian companies forgo open salary disclosure, citing it as unconventional in the industry. Finally, most companies also distance themselves from unions, a recurrent practice in Indian textile manufacturing companies, as expressed by Sen, (2012). This was corroborated by managers who emphasize direct communication with workers as a point of pride.

5.4.2.2 Social impacts of workers

Table 5.6 illustrates the workers' social impact hotspots using the heat-map system that goes from dark red to light green, where the darker the shade, the more critical the indicator is. Earning quality (red shade) is the indicator with the lowest score across all CSs, VC segments, and countries, and it is consistently lower for female workers and lower for Indian companies, where 45% of the women surveyed have incomes just below the minimum wage. *Job security* is also a major challenge, particularly for Remanufacture, where in both cases men and women have the lowest indicators. This could be partially explained by the mix between permanent and contract or informal workers, where most hires are women.

Reduce has critical challenges related to *earnings, labor security, physical, financial, and social assets, and for voice & collective bargaining*. In India female sorters working on the Recycle CS were the most vulnerable workers of all, as they have the lowest *earning capacity, economic opportunity, voice, & collective bargaining*. Rental has the highest earning of all CSs compared (although it remains a critical social hotspot). It is to be noted that workers on this strategy have a higher education than workers on other CSs, which could justify the higher earnings.

Well-being (*social assets*) including family time, community engagement, and participation are critical challenges, especially for Rental, Resale, Repair, and Recycle, followed by Remanufacture where women workers are most affected. Interestingly, even though Resale across the three countries is mainly carried out by non-profit organizations with a social mission, workers' well-being and gender equality and inclusion programs and resources show a hotspot where several aspects could be improved. *Financial assets* related to the capacity to save or pay debts are also significant challenges for Repair, Reduce, Remanufacture, and Resale. From the VC perspective, significant challenges remain for all three segments and for both types of workers. From the GE&I dimension, *economic opportunity, voice & collective bargaining and sexual and reproductive health rights (SRHR)* are critical challenges for several CS as well, but slightly lower for female workers.

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Dimension	Disaggregation lev.	VC-Segment				Circular Strategies								Countries															
		Manufacturing	Distribution	D-Eol		Reduce R2	Rental R3	Resale R4	Repair R5	Remanufacture R6	Recycle R7	India	The Netherlands	Spain															
Social impact indicators	Job of	Quality of Job	Quality of Job	Quality of Job	Quality of Job	Quality of Job	Quality of Job	Quality of Job	Quality of Job	Quality of Job	Quality of Job	Quality of Job	Quality of Job	Quality of Job															
	Earning quality																												
	Labour market security																												
	Work environment																												
	Human Assets																												
Workers Wellbeing	Natural Assets																												
	Physical Assets																												
	Social Assets																												
	Financial Assets																												
	Economic Opportunity																												
Gender Equality and Inclusion	Access to and control over resource																												
	Leadership & training																												
	Voice and Collective bargain																												
	Violence and harassment																												
	Health and security																												
Sexual and Reproductive Health and Rights																													
11.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 4																													
Most critical challenge															Significant challenge					Challenge but no priority					towards Good practice				

5.4.3 Socio-environmental baseline comparison

Figure 5.5 illustrates the socio-environmental baseline of the ten businesses. In the figure, system aspects are positioned above the respective environmental (material flow) or social impacts (workers' QOJ, well-being, and GE&I initiatives). Each company is represented by a color-coded circle containing an specific letter from A to J. The placement of these circles is determined by the presence or absence of specific system conditions or socio-environmental impacts attributes. A value of 1 (lagger side in red) denotes the absence of the attributes, while a value of 4 (leader side in green) signifies presence of attributes and thus good practice.

These values were computed by summing the number of attributes present, dividing by the total attributes per category (CE, QOJ, well-being and GE&I), and then normalizing to a four-point scale, as detailed in Table 5.2. This normalization process aligned system conditions with socio-material impacts and facilitated cross-company comparisons (see Annex 5.5).

Most companies and CS are positioned towards the lagger side concerning well-being and GE&I system aspects. Absent attributes in this context include salary parity, well-being programs, gender equality initiatives, and roles like diversity and inclusion (DAI) officers. This finding is relevant considering that most CS operate with a large migrant and refugee workforce in the assessed countries. However, some companies exhibit good practices, such as having a designated well-being officer and a budget for personal growth company (I) or providing child-care facilities and support company (A).

Conversely, when examining the hard system aspects of CE, companies generally are placed in the middle on the scale. Attributes like eco-designers, circular skills, circular capabilities, and waste monitoring emerge as commonly missing. Company (A) led by having most CE attributes, likely explained by the fact that Recycle is a well-established circular strategy. In contrast, companies focusing on Remanufacture (B and F) lack several system conditions, possibly due to the novelty of this CS, which is predominantly employed by SMEs (Dissanayake & Sinha, 2015).

Regarding material impacts and CE Indicators, most companies exhibit stewardship by addressing waste generation and incorporating circular materials in their CS implementation. However, as most companies are SMEs with restricted production capacity, it is critical to monitor overtime the potential presence of rebound effects where production efficiencies might be offset by over-production (Siderius & Poldner, 2021; Zink & Geyer, 2017).

While the QOJ system aspects are also placed in the middle of the scale, the impacts on workers' QOJ, are slightly lower with hotspot on earning quality and job security. This discrepancy arises from the lack of accessibility to existing policies and user orientation, hindering their recognition by workers and impeding the adoption of inclusive CE practices. Furthermore, despite workers' well-being impacts ranking slightly higher than related system aspects, the persistent lack of *financial and social assets* remains concerning. Similarly, while GE&I impacts slightly surpass GE&I system conditions, *economic opportunity, voice & collective bargaining* are existing challenges. This misalignment between system conditions and socio-environmental impacts stems from blue-collar workers not directly associating their work with personal well-being or GE&I, as highlighted by Müller et al., (2014). This underscores the importance of creating more awareness of these critical aspects among workers.

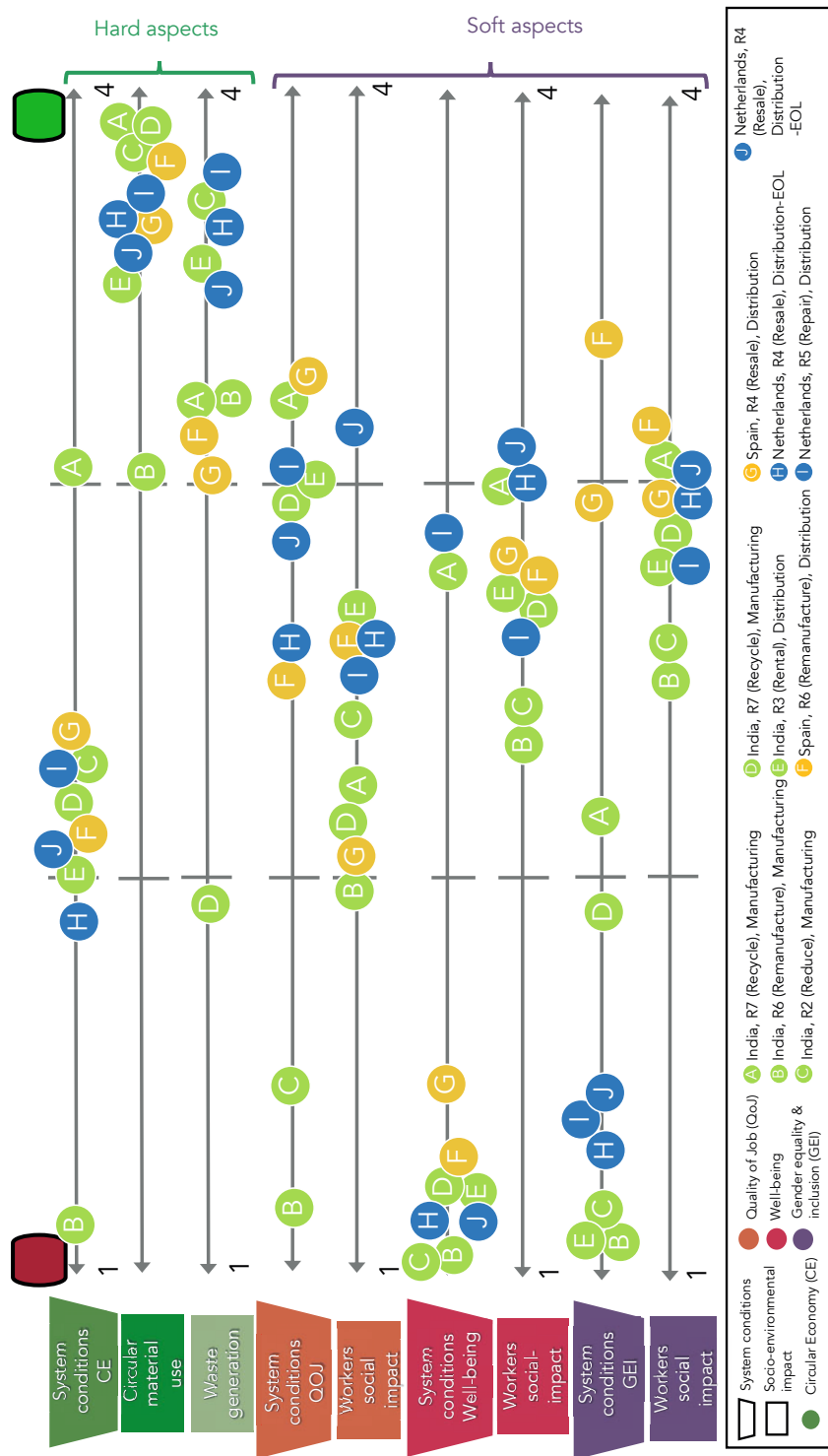


Figure 5.5 Socio-environmental baseline combined with the hard and soft organizational system aspects of the ten companies analyzed.
Source: Own elaboration.

5.5 Discussion

5.5.1 Challenges for improving social and environmental performance.

Three main challenges surface by simultaneously analyzing both systemic aspects and internal sustainability impacts of CE. First, there is insufficient systemic integration of soft and hard aspects of CE implementation. This lack of integration mentioned by Korhonen et al., (2018); Kumar & Anbanandam., (2020); Muster & Schrader., (2011); and Piecyk & Björklund., (2015) is critical for developing an inclusive circular corporate culture, where mindset, skills, and capabilities are aligned to enable an organizational CE transition, as indicated by Bertassini et al., (2021). For instance, hard aspects at the structural level such as CE training programs, CE indicators, and accurate waste measurement are absent. Additionally, many companies lack roles such as eco-designers or circularity officers while at the corporate culture level, there are significant gaps in circular skills, capabilities, and values.

In terms of material impacts, the circular indicators show a spectrum of progress towards circularity. While material reuse is in most cases optimized, and waste reduction is promising in seven cases, challenges are found in the recirculation of materials. This shows that there is room for system optimization and overall improvement of material impact.

In the case of QOJ, some inclusive-social system conditions such as policies related to salary parity, and ongoing training are present. However, according to workers responses (Table 5.6) a gender pay gap is present in all VC segments and countries analyzed. This shows that, in practice, the current gender parity policies and programs are ineffective in improving diversity and inclusion. According to Kania et al., (2018), system change conditions at the structural level, such as policies, programs, and regulations, are the easiest and often the first attributes to implement. However, if not done in consultation with the people affected by these policies, our study shows that they are useless.

The second challenge concerns the asymmetrical performance of social and environmental impacts. Circular businesses need to do more on the social side if they want CE implementation to help them achieve more sustainable development objectives at the business level. Specifically, in terms of raising wages, improving workers' well-being, equality of opportunity, salary and voice, & collective bargaining, they currently show the same low conditions as linear business models, echoing the findings in Chapter 2 Suarez-Visbal, et al., (2022a) and BSR., (2021). Furthermore, there is a lack of roles to promote GE&I and well-being and a lack of relation between human resources and circularity-sustainability staff, as their functions are compartmentalized. For instance, in

most companies, HR managers are rarely present when the operational team meets, and the operational team rarely discusses workers' well-being as this is considered out of their scope. This finding echoes the results in Chapter 2 by Suarez-Visbal, et al., (2022a), where it is signaled that "companies seem to be a bit lost as to how to approach the social side of circularity."

A last challenge concerns the lack of optimization when combining multiple CS. Fewer than 25% of companies monetize the combination of more than two CS. Additionally, circular hierarchy principles are seldomly used, with recycling being the most common CS, which can be explained by the fact that recycling is the strategy that requires the least system adaptations to the linear model. This aligns with Battesini Teixeira et al., (2023) observation that CE at the business level is still in its infancy, with rather reactive implementation and insufficient integration into companies' core *modus operandi*.

Furthermore, companies implementing CSs in all three countries seem to follow the same pattern of production of linear businesses, where the prevailing mental model is towards increasing the production of green products instead of producing less with fewer materials and an equal or greater gain Chapter 3 (Suarez-Visbal, et al., 2022b). For circularity to play a more transformative role at the company level, it is critical to incorporate principles of sufficiency, which emphasize producing just enough to avoid unnecessary production, thereby preserving natural resources and minimizing environmental degradation. Sufficiency encourages a mindset shift towards producing and consuming less, essential to achieve long-term sustainability goals in a Circular Economy (Bocken & Short., 2016; Schroeder et al., 2018).

5.5.2 Opportunities and enablers

Despite these challenges, enablers and opportunities are also present. First, regarding material efficiency, implementing CSs brings material impact improvements compared to linear production models echoing findings of Goyal et al., (2018); Jun & Xiang, (2011) and Van Berkel, (2010). Companies implementing CS generate significantly less waste than their linear counterparts, with waste generation ranging from 1% to 23%, while linear waste generation ranges from 25% to 40% (Jordeva et al., 2020; Li et al., 2021).

Second, the reused material input of 91% is significantly higher than the European average of 25% of industrial waste reuse (European Commission, 2012), which shows production efficiency at the SME level. However, as explained by Siderius & Poldner, (2021); and Zink & Geyer, (2017) if production increases, there is a potential to generate rebound effects, as higher efficiency is canceled out due to absolute increases in production.

Regarding recirculation, the Rental strategy outperformed other CSs. Products under the Rental strategy extended their life eight times through Repair before being finally recirculated through Resale. In contrast, all other CSs, except for Recycle, extended the life of items twice as the input material was reused. The Recycle strategy combined Reused and Recycled inputs, leading to materials being kept three times in the production process. However, this was not always in a closed-loop system, as in some cases, the input materials were plastic bottles or plastic bag waste. This variability in the Recycle strategy's performance highlights the influence of different input materials. These results indicate that companies implementing more than one CS demonstrate better circular material performance across the three environmental/circularity indicators than companies using only one CS.

Third, although health and safety have been previously identified as critical issues for circularity in the TAVC (Fürtner et al., 2021), they were generally well-addressed. This is likely due to increased scrutiny of sustainable practices. However, the long-term health risks associated with circular jobs may be challenging for workers to identify (Suarez-Visbal, et al., 2022b).

Finally, as EU regulations on human rights and circular due diligence are emerging around the globe, implementing frameworks combining social and environmental risk assessments will help businesses in the sector build anticipatory capacity for the new legal requirements to come (Suarez-Visbal et al., 2023).

5.5.3 Recommendations

A list of recommendations to improve both the material circularity (hard aspects) and the social elements (soft aspects) of business cases was created following the baseline analysis. Material circularity recommendations were developed based on current best practices found in literature and adapted to the specific requirements of each business case (refer to the comprehensive list of recommendations in annex 4.3). The social recommendations draw inspiration from the suggestions made in Chapter 4 by (Suarez-Visbal et al., 2024a) to improve social impact in the TAVC. These recommendations were evaluated in the context of each company and tailored to their circumstances.

5.5.3.1 Main common recommendations on hard aspects and environmental impact

Regarding environmental material circularity and waste reduction:

- Improve waste segregation and cleaning. One possible avenue could be to explore the mutualization of services²⁰, creating specialized eco-centers for segregation and preparation for circularity, as waste segregation and cleaning is a common challenge in all analyzed countries.
- Incorporate eco-design and waste hierarchy principles into daily operations, extending from design teams to management and floor teams.
- Integrate complementary circular strategies, such as Repair and Remanufacture, to Reduce the direct flow of unwanted materials going directly to Recycling.
- Establish and improve a segregated waste inventory to maximize collaborative alliances between different companies in the sector and across sectors to optimize open and closed loop material circulation processes.

Regarding circular skills and capabilities:

- Implement an ongoing Circularity-readiness training program accessible to employees at different levels (from floor workers to middle and high management). This training should offer modules linking circular production with circular consumption to encourage circular habits both at work and at home. Additionally, the training program could be tied to a reward system to incentivize improved circular performance among teams and across organizational levels and functions.

5.5.3.2 Main common recommendations for better social performance of different CSs implemented by businesses.

Regarding quality of jobs:

- Increase salaries by implementing short and medium-term plans to establish a living wage structure within an agreed-upon timeframe. This initiative should aim to address income disparities among different types of workers, starting with the most vulnerable jobs.
- Revise current human resources practices related to hiring and internal promotion to identify and eliminate biases, ensuring gender equity across all positions. Recognizing the presence of a gender pay gap in all

²⁰ "Rather than one firm creating a single solution for its own use, in a mutualized model, the solution is created for many, with the vendor distributing the benefits to all involved. Among them are increased cost savings, improved reliability of operational productivity, more efficient regulatory compliance, and access to greater innovation through network effects" pg. 1 https://www.broadridge.com/_assets/pdf/broadridge-mutualization-whitepaper.pdf

businesses analyzed, it is essential to establish a gender pay gap parity plan within a specified timeframe. This may involve a detailed evaluation of job requirements, roles, and pay scales compared to sector benchmarks.

- Develop, if non-existent, and disseminate existing human resources policies, programs, and resources aimed at workers' well-being, gender equality and inclusion more effectively, fostering a deeper understanding among employees. This not only enhances organizational performance but also builds empathy and loyalty.
- Implement multilingual regular training on anti-discrimination, violence, harassment, and SRHR issues. This is particularly crucial as a significant number of workers in all three countries are internal or external migrants or refugees.

Regarding workers' well-being:

- Establishing better and ongoing communication mechanisms, allowing employees to provide feedback on current practices and suggest solutions.
- Incentivize the creation of a well-being committee, ideally comprising workers from all departments. This committee can function as a consultative body and potentially have decision-making authority. Topics for discussion may include flexible work schedules and ergonomic working spaces.
- Co-develop alongside employees professional and personal growth programs through training, educational opportunities, and financial support. This could be done by strengthened connections with employee and community centers that offer literacy and savings plans, training and resources, and cultural integration programs.
- For companies with a high percentage of migrant workers create a role such as inclusion and diversity or well-being officer. Such roles could guarantee the incorporation of good practices when working with multicultural populations.

5.5.4 Limitations

The main limitations of this chapter relate to sample size and potential biases in survey responses. The small sample size restricts the generalizability of results, instead our findings offer insights into specific commonalities and differences among companies, circular strategies, employees, and operating countries.

Potential biases in survey responses cannot be neglected, as the surveys were facilitated on-site during working hours by the companies themselves. Efforts to minimize this risk included using separate rooms and ensuring no direct supervision, however, complete elimination of this risk could not be guaranteed. Consequently, some responses may have been more favourable than in alternative survey settings.

Additionally, there is a potential risk that companies presented a more positive image of their practices during interviews. To mitigate this risk, interview responses were cross verified with workers' surveys, and workers' responses were cross-checked with salary data provided by the companies.

Due to the diverse backgrounds, geographic locations, and educational levels of workers, there was a potential for misinterpretation of survey questions. To mitigate this, a multilingual canvasser team conducted the survey, incorporating videos and providing the option to speak or select answers using a software interface to enhance comprehension. Despite these measures, the risk of workers not fully understanding the questions could not be completely eliminated.

In terms of the MFA, assumptions were made as companies in the three countries did not always have written records of all the information needed. The reliability of the data was sometimes difficult to verify. As the MFA process requires a mass balance validation, some of this data was corrected by companies. However, official documents that could be used as evidence of what they were saying were not always available. To reduce the bias, data was triangulated with literature to ensure common practices were still present.

5.5.5 Future research

Future research could focus on i) implementing the given recommendations with businesses to understand how they transition to more inclusive circular practices and what challenges they face. ii) Extending the sample size to more companies or more countries of the value chain, allowing for more generalization of research outputs. iii) Integrating the energy flow analysis in addition to the material one. iv) Additionally, given that long-term health considerations are critical for the implementation of CS, future research could focus on a longitudinal study for potential health and toxicity associated with Remanufacture, Reuse and Recycling of textile waste. Finally, a comprehensive external analysis that includes regional policies and socio-cultural aspects will undoubtedly enhance the exhaustive internal analysis performed by this study, by proving a richer and nuance understanding.

5.6 Conclusions

The aims of this study were to provide empirical evidence on the internal challenges and opportunities faced by circular businesses in managing both the soft and hard aspects of circularity and to identify associated socio-environmental impacts and potential trade-offs of CE implementation at the

business level. We achieved this by establishing a systemic socio-environmental baseline for ten businesses implementing CS across three countries.

According to the socio-environmental baseline, CSs in general outperform linear models in terms of material impacts, with "Reduce," "Rental," and "Repair" showing the highest potential for material efficiency. Additionally, combining different circular strategies could further improve material efficiency, presenting an underexplored opportunity. However, workers' social considerations lag behind with common critical hotspots across countries and CSs, including earning quality, voice, collective bargaining and SRHR.

Furthermore, the lack of a holistic system perspective that considers both social and environmental aspects was the most critical challenge for all companies implementing CSs. Many companies exhibit incomplete or disconnected system-change conditions, lacking integration between the hard and soft aspects of circularity. Despite some existing policies and programs at the structural level, there is lack of initiatives addressing well-being and gender equality. Gaps in CE metrics and CE indicators were evident from the hard side. At the relational level, key roles to accelerate the uptake of inclusive circular practices, such as circular managers, eco-designers and well-being and diversity officers, are often missing.

Finally at the transformational level, CE corporate culture was not explicit in at least half of the companies. Although companies implementing circular strategies have sustainability values in place, these are not explicitly articulated for circularity, with evident gaps related to circular capabilities and CE skills. Furthermore, well-being HR capabilities and associated mental models are rather the exception than the norm. These gaps in corporate culture are reinforced by behaviors still engrained into the linear production model, where producing more green products is preferred, rather than producing less, with less materials and equal or greater gain.

These findings are critical for businesses implementing CS, as results make evident the need for businesses to align internal systems to improve performance in both social and environmental dimensions of CE. In this regard, businesses should ensure that their policies regarding workers' well-being and gender equality and inclusion are actionable, adaptable, and well-understood by all staff, not only managers. They should establish dedicated roles to safeguard and champion workers' well-being and circular considerations, and finally, they should reinforce their corporate culture with both inclusive circular skills and capabilities, and circular mindset to complement circular values.

This chapter contributes to the CE managerial field by offering a comprehensive lens for assessing circular management practices, integrating environmental and social impact indicators with systemic attributes and organizational culture. Additionally, it provides a holistic socio-environmental baseline assessment framework that can highlight potential sustainability trade-offs and opportunities to enhance CE's socio-environmental performance. Implementing a framework such as the one presented in this research (combining social and environmental risk assessments and outcome performance) will help businesses in the sector build anticipatory capacity for the new legal requirements to come.

Furthermore, this study contributes to the literature on Organizational Change in Circular Economy (OCCE) by developing a systemic socio-environmental baseline framework that melds systems thinking with organizational management for CE combining processes and metrics to evaluate (identify trigger points, challenges and opportunities) of the transition to a CE at the organizational level, addressing a gap identified in the literature. It also advances the theory by providing evidence and concrete empirical examples of the sustainability impacts, both present and potential, generated by CE practices implemented by TAVC businesses in various geographical locations. Finally, by combining soft and hard systemic aspects of CE into this comprehensive, transformative CE transition framework, this research facilitates the adoption of more inclusive circular practices, improving businesses' internal sustainability performance.

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"We need belief systems and traditions, but when they are grounded in inequality and oppression, they become tyrannical and must be uprooted and replaced with notions of equity, fairness, and collective well-being..."

-Author

6

Transitioning to a Just and Inclusive Circular Textile Value Chain. Evidence From Ten Business Case Studies from India, Spain, and the Netherlands.

Based on Suarez-Visbal, L.J; Rosales-Carreón, J; Corona, Worrell, E.
Transitioning to a Just and Inclusive Circular textile value chain. Evidence
from ten business case studies from India, Spain, and the Netherlands.

Submitted to the Special Issue on "Just Transition, Inequalities and Well-being" in Environmental Innovation & Societal Transitions Journal.

Abstract

Using organizational business experimentation, this study explores how small and medium-sized enterprises (SMEs) in the textile and apparel value chain transition toward a more inclusive and Just Circular Economy (CE). We employed a mix-method approach with ten circular SMEs across three countries to assess the effect of implementing more inclusive circular practices on selected socio-environmental aspects critical for the sector. Through Sustainable Transition Experiments (STEs), a just transition system-change approach was implemented for six months and evaluated using social impact assessment and selected circular material indicators.

Our findings highlight that experimental approaches simultaneously focusing on circular and social aspects are essential to foster CE adoption. This yields environmental gains, such as increased material circularity and reduced waste generation, together with social gains. Main social advancements included: increased worker voice through well-being and committee initiatives, greater gender pay parity, open salary policies, and, in some cases, reduced job vulnerability through formalized contracts. Nonetheless, challenges remain, notably in achieving living wages, reducing informality, and broadening access to collective bargaining. The study underscores the importance of sustained worker engagement and advocates for sector-wide policies that support living wages and social protections for circular jobs. By embedding social sustainability within circular strategies at the business level, this research proposes a transformative CE approach. This study contributes to CE literature by highlighting the significance of a just and inclusive transition and provides actionable insights for policymakers and business leaders aiming to foster resilient, equitable CE practices.

keywords: Circular Economy, Business Experimentation, Social Sustainability, Organizational Change, Just Transition, Circular Fashion, Social impacts

6.1 Introduction

The Textile and Apparel Value Chain (TAVC) has long been criticized for its unsustainable practices, including resource-intensive production (Niinimäki, 2018), wastefulness (Niinimäki et al., 2020; Shirvanimoghaddam et al., 2020), and poor working conditions throughout its lifecycle (Fletcher & Tham, 2014). To mitigate this array of socio-environmental issues, in recent years, there has been a shift towards embracing a Circular Economy (CE) (Kalmykova et al., 2018; Kirchherr et al., 2017; Millar et al., 2019). This shift toward circularity is commonly referred to as the Circular Transition (Hekkert et al., 2021).

While adopting CE practices in the TAVC holds promise to address environmental concerns and improve resource efficiency, challenges remain in ensuring social sustainability (e.g., equitable labor practices, workers' well-being, equality, and inclusion). Chapters 2, 3 and 4 highlight that current CE strategies may perpetuate poor working conditions, low wages, and gender inequalities, particularly affecting women in vulnerable positions (BSR, 2021; Suarez-Visbal, et al., 2022b).

To rebalance its socio-environmental performance prior research suggests that CE requires more transformative approaches. For instance, Svenfelt et al., (2019) propose a collaborative economy, CE in welfare state, local self-sufficiency and automation for quality of life as possible scenarios for CE. Similarly, Calisto Friant et al., (2020) propose a reformist circular society, technocentric CE, Fortress CE and Transformational Circular Society as alternatives typologies for a more inclusive CE. Regarding the TAVC, Suarez-Visbal, et al., (2024c) argue that a transformative CE is a critical departure from the status-quo, where social impacts and gender inequalities are considered, addressed, and integrated across CE practices.

Furthermore, Ghisellini & Ulgiati, (2020); Kirchherr et al., (2018); Murray et al., (2017); Padilla-Rivera et al., (2020) agree that adopting a holistic perspective that integrates systems-thinking within a CE transformative approach is crucial. At the business level, a holistic perspective simultaneously considers the social and environmental impacts of the circular transition (Korhonen et al., 2018) while system thinking integration considers system-change conditions and levels (Kania et al., 2018; Kirchherr et al., 2017) for CE.

In organizational change management for CE (OCCE) studies, social and environmental consideration are also associated with hard and soft aspects (Graessler et al., 2024), where "hard" aspects refer to policy, processes, technology, and financial resources to ensure material efficiencies and waste

reduction (Abdelmeguid et al., 2022; Goyal et al., 2018; Lenka et al., 2010). The “soft” aspects refer to human resources practices (Chiappetta Jabbour et al., 2019; Muster & Schrader, 2011) corporate culture (Bertassini et al., 2021), and factors such as job quality, worker well-being, and gender equality & inclusion (Suarez-Visbal, et al., 2022b).

Additionally, EEA, (2024); Sharpe et al., (2022a); Sharpe & Martinez-Fernandez, (2021); Suarez-Visbal, et al., (2024c); and Swilling, (2019) argue that a just transition lens can offer a holistic view to harmonize CE policy with business practices, by showing a way to address both social and environmental concerns at the organizational level. In this sense, a just CE transition should consider the changes in employment practices and skills while considering social dialogue, union and worker representation and active participation (Fairbrother & Banks, 2024).

However, little is known about how a CE just transition lens can be applied in practice at the business level. Hence, this research identifies three knowledge gaps; first, a lack of understanding about how companies embrace “transformative (inclusive and just) CE practices”, the internal transformations they undergo (between the soft and hard aspects), and their resulting socio-environmental impacts (Clube & Tennant, 2022; Franco, 2017; Sousa-Zomer et al., 2018).

Secondly, even though business experimentation has been used to enable CE adoption and collaboration between businesses (Bocken et al., 2019; Bocken et al., 2021), internal-business experimentations (Hofmann & Jaeger-Erben, 2020); the assessment of its actual socio-environmental impacts and the organizational reconfiguration businesses undergo remain poorly understood (Caniglia et al., 2017; Linder & Williander, 2017). Thirdly, diverse empirical evidence regarding how just and transformative CE experimentations occur across countries is missing (Clube & Tennant, 2022). This gap is particularly pressing given the sector’s reach through various geographies, each characterized by differing levels of development and workers vulnerability (Dachs et al., 2019; Mishra et al., 2021; Moktadir et al., 2020; Strange & Zucchella, 2017).

Addressing these gaps holds significance for the sustainable management field. On one side, identifying shortcomings in current CE practices, such as the perpetuation of poor working conditions and gender inequalities will aid to develop more transformative strategies tackling social and environmental aspects, thereby leading to more sustainable outcomes at the business level. On the other hand, unveiling the effect of business experimentation in the circular transition will provide evidence on how to implement a just and

inclusive CE transition for the sector. To address these gaps, the study will answer the following research question:

How does a TAVC companies' organizational system transition to a more transformative and Just CE through experimentation?

By building upon the recommendations of ten circular business cases presented in Chapter 5 (Suarez-Visbal et al., 2024b), this study aims to understand how these system's changes affect both social and environmental issues (e.g. the material flows and social aspects such as job quality, well-being, gender equality, and inclusion).

The structure of the chapter is as follows: Section 2 delves into the theoretical background of CE at the business level, organizational systems change, just transition and CE experimentation. Section 3 outlines the research methods employed. Section 4 presents the results from the analysis of ten business cases. Section 5 discusses the findings, addresses limitations, and suggests potential directions for future research, followed by conclusions in Section 6.

6.2 Theory

6.2.1 Circular Economy, sustainability impacts and Just CE transitions at the business level

CE aims to accelerate sustainable development by promoting reducing, reusing, recycling, and recovering materials in production and consumption processes (Kirchherr et al., 2017). In the TAVC, the most used circular strategies (CS) are Rethink, Redesign-reduce, Rental, Resale, Repair, Remanufacture, and Recycle, as explained by Accenture, (2019); Guldmann, (2016); Jung & Jin, (2016); and in Chapter 3 Suarez-Visbal et al., (2022b). These CS are relevant as the sector is material-intensive and a significant waste generator. Additionally, as identified by Circle Economy, (2023); Llorente-González & Vence, (2020); Repp et al., (2021) CS are also labor intensive.

At the business level, CE has been perceived as a way to mitigate environmental impacts because it privileges using renewable energy sources (Jun & Xiang, 2011), and optimizes material use and waste reduction (Goyal et al., 2018; Van Berkel, 2010). The social contribution of CE has been narrowly associated with job creation (Millar et al., 2019). However, recent research argues that quality of employment is also a critical social consideration for CE. According to BSR, (2021) and Suarez-Visbal, et al., (2022b) low earnings, lack of workers' voice, and workers' well-being remaining critical challenges with the current implementation of CE practices. Even more, in Chapter 3 Suarez-Visbal, et

al., (2022b) demonstrate that circularity emulates the questionable working conditions of linear production. It also corroborates the lack of a holistic perspective as one of the most notable weaknesses in the CE business implementation, as also identified by e.g. Kirchherr et al., (2017); Murray et al., (2017); and Padilla-Rivera et al., (2020).

According to Schröder, et al (2020); Sharpe & Martinez-Fernandez, (2021); Suarez-Visbal et al., (2024c); Swilling, (2019), a just transition lens will suit the purpose of merging social and environmental concerns. A just transition (JT) in CE aims to shift from a polluting practice to decarbonization practices while securing decent jobs for workers across the value chain (Sharpe et al., 2022a; Suarez-Visbal, et al., 2024b). The notion of a just transition is primarily used at a policy level; it is also useful at the business level to rebalance the asymmetry between social and environmental considerations of the CE transition.

A CE just transition (JT) lens looks at who is affected with circularity (recognitional justice), how stakeholders are affected (distributional justice) and what kind of structures and mechanisms are in place that constrain or enable change to more inclusive practices (procedural justice) (EEA, 2024; Sharpe et al., 2022a; Suarez-Visbal, et al., 2024c). JT offers a more comprehensive approach to improve working conditions of current circular jobs, making elements such as job security, gender pay gaps, fair wages, health care provisions, and workers' collective bargaining across the value chain more salient. Additionally, a CE just transition at the business level considers the changes in employment practices and skills resulting from the CE transition, while aiming to enable social dialogue, through unions representation and workers active participation (Fairbrother & Banks, 2024). In this way applying a just CE transition could incentivize present jobs transformation and creation of new better circular jobs Chapter 5 (Suarez-Visbal, et al., 2024b).

6.2.2 Organizational change management for Circular Economy and systems change

At the business level transitioning towards CE involves multifaceted changes, encompassing technological advancements (Ritzén & Sandström, 2017; Sarja et al., 2021), organizational restructuring (Chiappetta Jabbour et al., 2019b; Lozano, 2012), shifts in corporate culture (Bertassini et al., 2021); and in behaviors and mindset (Chizaryfard et al., 2020; Dufva et al., 2017). One way to analyze the CE transition within businesses is through Organizational Change Management for Sustainability (OCMS). It is a strategic approach that guides organizations through sustainable transformations, aligning business practices with environmental and social objectives (Bögel et al., 2019; Lozano & Garcia, 2020).

A recent stream of OCMS called the OCCE (Organizational Change for CE) (Graessler et al., 2024) has emerged to guide the organizational transition to CE planning. OCCE entails multidimensional, holistic, and systemic change that requires fundamental shifts in every aspect of the organization (Eikelenboom & de Jong, 2022; Re et al., 2024; Zollo et al., 2013). It includes planned deliberate activities to move an organization from its present state to a desired CE future state. According to Graessler et al., (2024), OCCE studies analyze change from several perspectives, such as changes from the hard or technical perspective (e.g., products, services, and business models), soft-human related perspective (e.g., behaviors, culture, and mindsets), and organizational changes (e.g., structures, strategies, and capabilities).

By applying an OCCE lens, hard and soft aspects of the CE transition at the business level can be addressed in parallel, minimizing potential social and environmental trade-offs. The hard aspects of CE implementation consist of technological resources and operations to reduce costs and optimize material use (Boks, 2006; Goyal et al., 2018; Song et al., 2019), while CE soft aspects include HR initiatives (Chiappetta Jabbour et al., 2019), and corporate culture elements such as values, and CE skills (Bertassini et al., 2021; Lozano & Garcia, 2020). In terms of the TAVC, scholars advocate for the inclusion of additional soft aspects such as workers' well-being (Rubery, 2019; S. Sharpe et al., 2022a); gender pay gaps (Hale & Wills, 2008; Suarez-Visbal et al., 2024b) and diversity of workforce (Ascoly, 2009) as the sector is highly feminized.

A complementary way to elucidate the potential socio-environmental effects of system changes in organizations is through systems thinking and systems-change. *Systems thinking* is an approach that identifies the interconnectedness of different components, the tensions, and their possible effects of change within organizations (Edmondson et al., 2001; Kania et al., 2018; Wachter, 2011). Kania et al., (2018) propose a systems-change model quite suitable at the organizational level. It proposes 3 levels of system change to enable or hinder systems transformation (structural, relational and transformational); in which 6 system-change conditions operate (see figure 6.1). By melding OCCE with systems thinking, we can develop a holistic approach that considers the interconnectedness of socio-environmental factors, identifying intervention points at the business level to foster learning and adaptation to achieve sustainability goals.

6.2.3 Experimentation to accelerate the incorporation of social and organizational change aspects in the CE business transition.

Evidence from various fields supports the pivotal role of experimentation in driving organizational change and innovation within businesses (Bocken et

al., 2021; Weissbrod & Bocken, 2017). For example, studies in organizational psychology indicate that experimentation can facilitate cultural transformation within organizations by fostering new norms, values, and behaviors (Edmondson et al., 2001). In organizational change studies, experimentation is seen as an effective way to enhance HR practices and advance gender equality initiatives to advance inclusive work environments (Benschop & Verloo, 2010).

In the CE implementation, Circular Business Model Experimentation (CBME) has gained significant attention (Bocken et al., 2021). CBME has been proven to engage employees in circular business practices, reduce resistance to change, and enable internal and external support for sustainability transitions (Weissbrod & Bocken, 2017). This type of experimentation is concerned with how a business does business; it considers the value proposition, value creation and delivery and value capture (Bocken & Short, 2016). As a result, most CBME studies focus on intercompany experimentation and external collaboration to develop sustainable products or services (Bocken et al., 2021). Hofmann & Jaeger-Erben, (2020) assert that intra-company experimentation can also enable broader organizational change towards improved social and environmental performance. However, how intracompany experimentations happen, and how do inclusive circular practices affect organizational change remains largely underexplored.

Sustainable Transitions Experiment (STE) is another type of experimentation, that lends itself well to analyze real-world interventions to catalyze systemic change toward sustainability within specific domains (Williams & Robinson, 2020). STEs addresses the interconnected economic, ecological integrity and social justice challenges from local to global scales (Luederitz et al., 2017). While sustainability transitions can take years or even decades (Bernstein, 2015; Bos & Brown, 2015), STEs typically run for months (Williams & Robinson, 2020). They are characterized by being small-scale, location-specific interventions (Voytenko et al., 2016) and by creating transdisciplinary collaboration between actors from academia, with government, and or businesses or civil society. Their aim is to create positive outcomes that are replicable, transferable, and scalable (Bernstein, 2015; Bos & Brown, 2015).

According to Luederitz et al., (2017), an STE process typically involves the following iterative steps: i) initial diagnosis (or baseline assessment), ii) setting of goals, iii) setting logistics such as duration, stakeholders' roles and responsibilities and timeline (which we call roadmap) iv) rollout, v) reassessment of the new state, vi) comparison and vii) lessons learned. STEs have been successfully implemented in energy, climate change, and urban contexts (Williams & Robinson, 2020). Although not yet explored from this lens, it is

possible to use STEs to analyze a just CE transition and explore how businesses in the TAVC integrate inclusive Circular Economy practices.

6.2.4 Conceptual framework

Our framework integrates elements from theories on organizational system changes theories, just transition and STE, to explore how businesses within the TAVC implement inclusive circular strategies. Figure 6.1 illustrates the progression towards a transformative Circular TAVC through the application of STEs. On the left, it depicts how different businesses across various segments of the TAVC adopt different circular (R) strategies while participating in STEs in collaboration with academic institutions. These STEs are designed to incorporate social and environmental recommendations and follow a seven steps process carried out over three iterative phases, based on the STE conceptualization of Luederitz et al., (2017). The seven iterative steps are described on the right side of Figure 6.1.

The *Preparation Phase* consists of three steps i) mapping the six system-change conditions necessary for advancing systemic change towards a CE encompassing both soft and hard aspects- rules & regulations, resources, roles, relations, power dynamics, and corporate culture- based on the frameworks from Kania et al., (2018) and Bertassini et al., (2021). ii) Conducting a socio-environmental baseline assessment, and iii) developing socio-environmental recommendations for piloting. Following the methodology of Chapter 5, by Suarez-Visbal et al., (2024b) the social assessment focuses on Quality of Jobs (QOJ), worker well-being, and gender equality & inclusion (GE&I). On the environmental side, the key indicators include the inflow of new and secondary materials (MI), material recirculation (MR), and waste reduction (WR).

The *Implementation Phase* comprises two steps: iv) developing a roadmap and v) executing the rollout. Finally, the Evaluation phase involves, vi) conducting a post experimentation assessment, comparing changes in key social and environmental indicators and reflecting on lessons learned. This structured, iterative process provides a systematic process to implement and evaluate transformative CE transitions within businesses, promoting learning and continuous improvement.

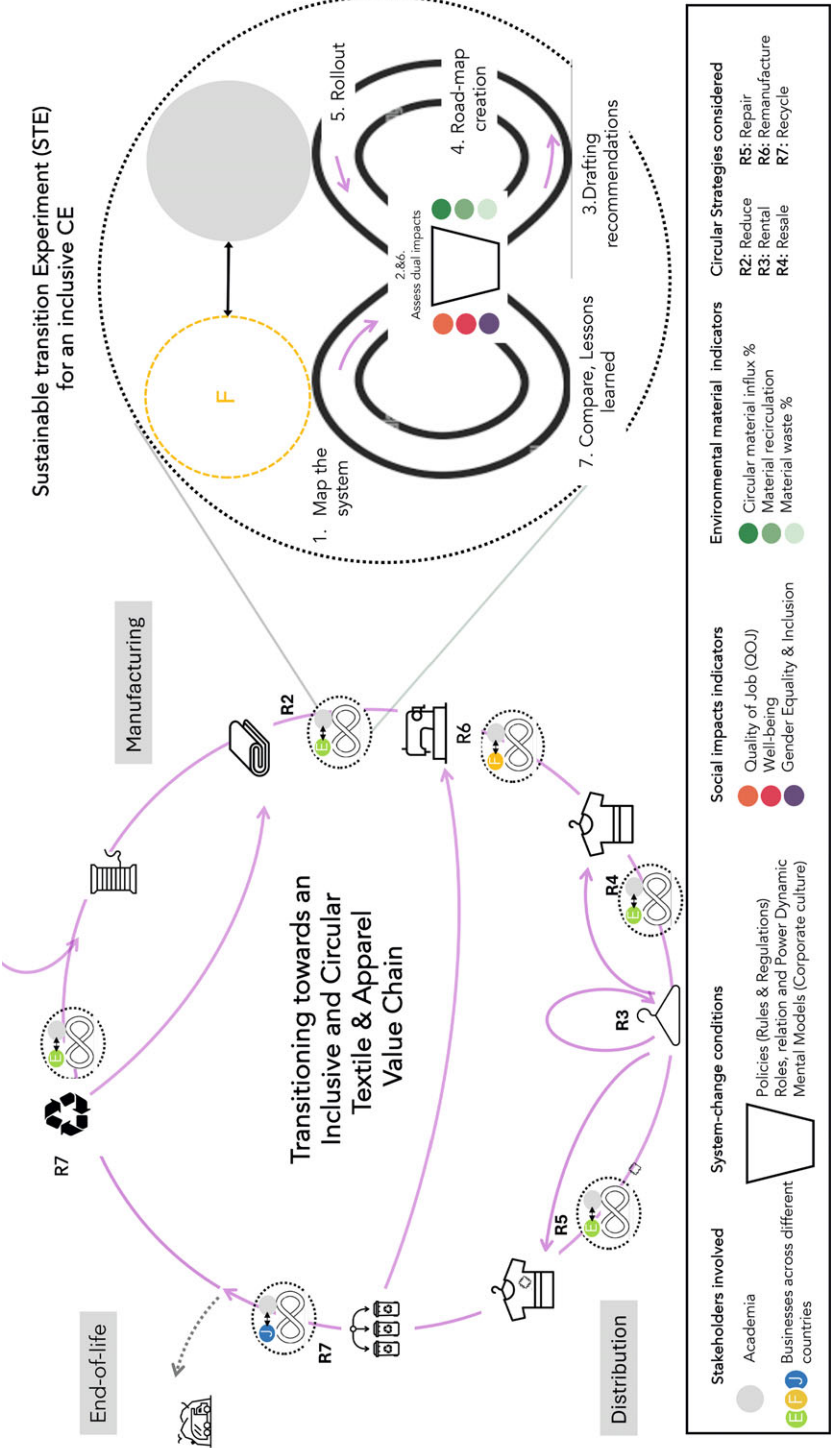


Figure 6.1 Conceptual framework: Transitioning towards a transformative CE through Sustainable transition experiments (STE's).

6.3 Methods

This mixed-method research encompasses ten Sustainable Transitions Experiments (STE) conducted with circular businesses across three countries. The aim of the STE was dual. The first aim was to improve the social and environmental impacts of circular strategies implemented by different businesses. The second aim was to understand the system change process; how do companies internally navigate with their socio-environmental ambitions. The STE consisted in experimenting with the implementation of targeted socio-environmental recommendations previously created for each company which was done in Chapter 5 by Suarez-Visbal et al., (2024b). Table 6.1 delineates the three Phases followed in STE: *Preparation*, *Implementation*, and *Evaluation*. The *Preparation phase* (highlighted in gray) was previously conducted in Chapter 5 by Suarez-Visbal et al., (2024b). This study started with the *Implementation phase* with the roadmap creation and rollout of a six-month experiment to implement the socio-environmental recommendations resulted from the first phase. In the last phase (*Evaluation Phase*), we assessed and compared the environmental and social impacts related to the implemented circular strategies with those associated with the environmental baseline derived in the preparation phase. For consistency we replicated the exact methodology and calculations as used in the Preparation phase in Chapter 5 by Suarez-Visbal et al., (2024b).

Table 6.1 Methods, phases and activities of STE employed in this research.

Activities/ Phases	Preparation Phase			Implementation Phase	Evaluation Phase
Steps	1. Current system map	2. Socio-environmental base line	3. Drafting of Recommendations	4. Define RoadMap & 5. Experiment Rollout	6.&7. Assessment of the new state and comparison
Qualitative data collection of soft and hard aspects	Taken from Chapter 5, (Suarez-Visbal et al., 2024b).			<ul style="list-style-type: none">• Monthly semi-structured interviews• Field notes on roadmaps	<ul style="list-style-type: none">• Semi-structured interviews with CEO-operational and HR management
Quantitative data collection of hard aspects				N/A	<ul style="list-style-type: none">• Material Flows and circular indicators performance per company, CS, and VC segment
Quantitative Data Collection soft aspect					<ul style="list-style-type: none">• SIAF-CEg³ Survey (Suarez-Visbal, et al., 2022a)
Qualitative data analysis of soft and hard aspects				<ul style="list-style-type: none">• Deductive, thematic coding• Word frequency	<ul style="list-style-type: none">• Thematic coding• Comparative analysis of baseline scenario wit results from second Phase
Quantitative data analysis Of soft aspects				N/A	<ul style="list-style-type: none">• Social impact assessment framework (SIAF-CEg³)
Quantitative data analysis hard aspects				N/A	Calculation of three indicators: (1) % of reused and recycled material, (2) % of waste generation. (3) Recirculation of materials Use of MFA (material flow analysis)

6.3.1 Sample

The population sample consisted of ten different companies, which are a mix of startups, SMEs, and not-for-profit or for-profit entities active in different segments of the TAVC, present in the Netherlands, Spain, and India. These companies had implemented one or more CS, as depicted in Figure 6.2, and participated in prior research conducted in Chapter 5 to assess a socio-environmental baseline for implementing different circular strategies (Suarez-Visbal et al., 2024b). As seen in Figure 6.2, each company was given a letter code from A to J and a country-color, green for India, blue for the Netherlands and yellow for Spain, to facilitate comparison.

6.3.2 Implementation phase

Core activities in the implementation phase included the creation of the company roadmap and the actual rollout of experiments. The roadmap took a couple of weeks as companies needed to agree internally on which of the suggested recommendations (summarized in annex 6.1) to prioritize and allocate responsibility for the implementation. The final roadmaps contained selected recommendations for implementation, specific tasks, responsibilities, and timelines for follow-up meetings with the research team and piloting team. The starting date was also chosen by each company and rollout lasted between 6 to 8 months.

Data collection

Qualitative data was collected using the ten roadmaps' field notes created for each company and from the semi-structured interviews. Drawing from the Cornell note-taking method (Saran et al., 2022), each task had a designated space for recording observations per meeting, with additional space for capturing participant sentiments and concerns. Annex 6.2 provides the Excel document of the roadmap.

The semi-structured periodic interviews occurred every 3 or 4 weeks with each company's Corporate social responsibility agent, operational manager, or HR management representative. Fifty-four semi-structured interviews were conducted during the six-month experimental period, each lasting approximately 20 minutes. All interviews were recorded, translated, and transcribed using otter.ai. The interview guide is available in annex 6.3.

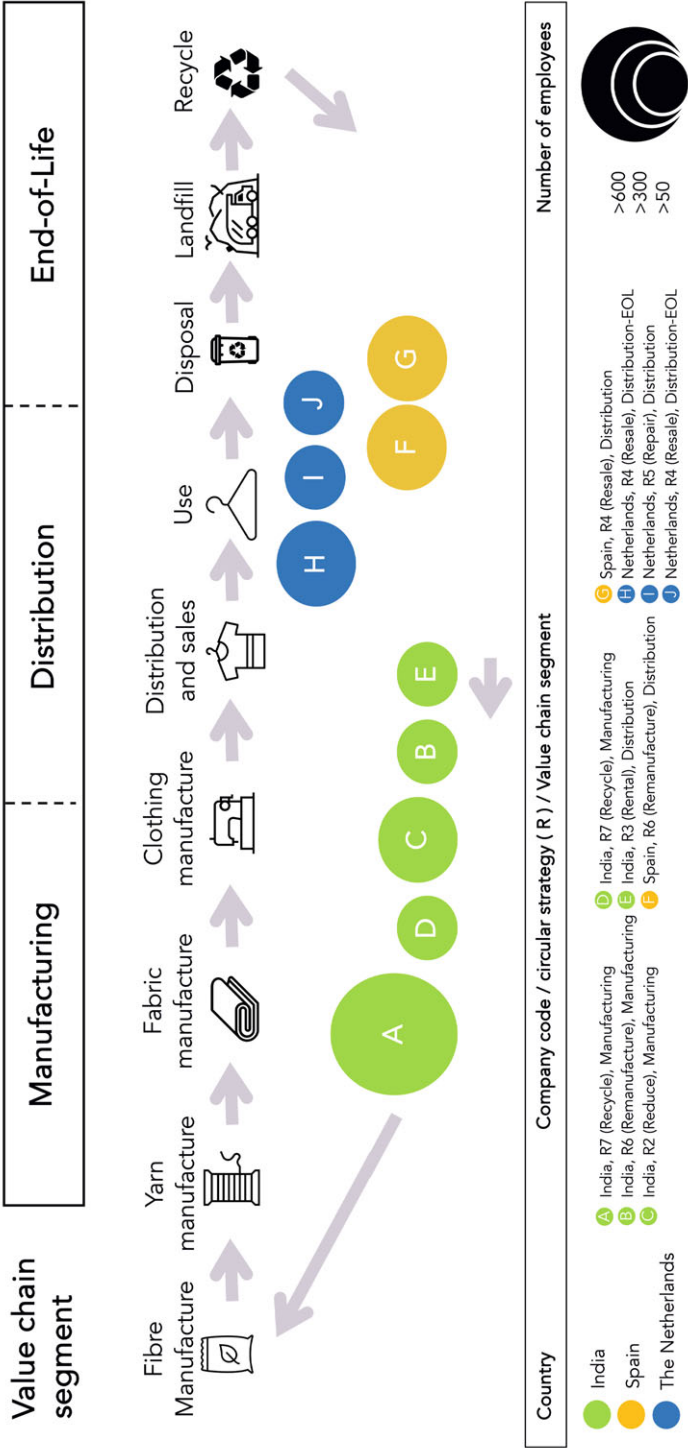


Figure 6.2 The sample of ten companies, defined by place on value chain segment, country and principal circular strategy employed.

Data analysis

Qualitative data was analyzed through deductive thematic coding and word frequency examination. We identified critical themes by exploring management perspectives regarding the implementation of recommendations. We also explored the benefits and challenges for companies in adopting inclusive Circular Economy practices.

6.3.3 Evaluation phase

During this phase, the aim was to see what changed in the system conditions after implementing the recommendations and how these modulations affected social and environmental impacts. This phase consisted of impact assessment after the experiment, and comparison between the initial and the final states.

Data collection and data analysis

The second assessment followed the same data collection and analysis process conducted in Chapter 5 by Suarez-Visbal et al., (2024b), as indicated in table 6.1. The collected quantitative data included ten pre-set-excel forms to calculate circular indicators and material flow (Brunner & Rechberger, 2004), as well as 132 workers' surveys. The qualitative data included 11 managers' semi-structured interviews. The interview guide is in annex 6.4.

The qualitative data analysis consisted of thematic coding for the semi-structured interviews. For the quantitative analysis of the workers surveys, we used the social impact assessment framework (*SIAF-CE*) used in Chapter 5 by Suarez-Visbal et al., (2024b). It focuses on three indicators: QOJ, well-being, and GE&I. To assess the environmental impacts of materials we used MFA (material flow analysis) along with three circular materials indicators: i) the percentage of reused material, ii) the percentage of recycled material, and iii) the percentage of waste reduction. For details of formulas and calculation for quantitative data see Chapter 5 by Suarez-Visbal et al., (2024b).

For the comparison, a heatmap color-coded scale was used, with red shades representing critical challenges; orange shades representing significant challenges; yellow shades representing no-priority areas, and green shades representing good practices. The comparison focused on identifying both positive and negative changes in social and material hotspots, as well as commonalities and differences between organizational systems based on type of company, position in the value chain, and CE strategy.

6.4 Results

6.4.1 Implementation Phase

This section describes the benefits and challenges identified regarding the experimentation process.

6.4.1.1 Benefits

For some businesses, the piloting process streamlined operations significantly. As stated by the operational manager of company E, hereinafter (E), “This process injected energy into areas that required attention.” For other companies, such as (A) “the regular follow-up and duration of piloting established a routine that extended beyond the experimentation phase.” Furthermore, for some, it provided an opportunity for deeper exploration, as articulated by (I): “Piloting helped us uncover root causes and raised further questions, such as how to implement living wages in Europe where the concept is less common.” In three out of ten cases, the piloting process extended corporate social responsibility (CSR) programs to an intra-company level, offering a unique chance for internal collaboration. As highlighted by (H): “This piloting facilitated significant internal collaboration between our CSR department and the HR management team, adding extra value to the business, which is unique, as CSR tends to look for outward impact only.”

In six companies, the experiment activities had a ripple effect across the company. For instance, Spanish, company (F), established a worker’s committee which benefited those directly involved in circular activities but also all employees within the organization, as workers’ committees usually have a companywide scope. In the Netherlands, company (H) started the worker’s assessment process in two other locations once the piloting finished. Similarly in India, companies (B) and (E) were able to replicate pilot recommendations related to waste measurement in other branches. Furthermore, in two other companies, the HR department’s adoption of inclusive hiring practices (as recommended during *phase 1*) introduced an opportunity to reduce bias when hiring, ensuring that a greater pool of workers across company departments is considered.

Finally, experimentation proved to be a valuable mechanism to enable internal change; as put by CSR Manager (H): “The researcher team provided knowledge, guidelines, coaching, support and tools that helped us along the way. Without their intervention, we would not have gotten as far as we did.” The research team served as a catalyst, facilitating conversations and inspiring trust, but the decision to move forward ultimately rested with the businesses themselves.

6.4.1.2 Challenges

Cross-departmental collaboration was considered a critical element of experimentation, as inclusive circular practices required the participation of both HR and operational departments. However, this collaboration was not always easy. Two companies lacked the participation of either the operational team or the HR team, hindering the inclusive CE experimentation progress. This resulted in partial adoption of the social recommendations and little to no implementation of the MFA recommendations. The fact that in the other eight businesses, internal collaboration happened, sheds light on how cross-departmental collaboration is critical for transformative CE experimentation success.

Prototyping new products was part of the MFA recommendations in four business cases. Prototyping implied designing, manufacturing, and testing sample products. Prototypes that fit a current production model were easily adopted, as they only needed to adjust or reduce the use of materials through design. However, recommendations that required exploring new business models and external collaborations were harder to test. Initially met with skepticism, these collaborations required establishing a financial case and shared value for all parties involved. Figuring out a balance between financial benefit and risk-taking for all parties involved was delicate as parties held a high level of mistrust. It was hard for companies to see prototyping as an experiment. They struggled to separate the notion of sellable products from an experimental product whose financial case is unclear. This was the case for Rental businesses trying to adopt Remanufacture practices or Remanufacture businesses trying to offer take-back programs. This shows that experimentation is a new process among businesses implementing circular practices. As Leuderitz et al. (2017) expressed, sustainability experimentation requires dedicated space, time, resources, and tolerance to unclear risks and possible failure.

Finally, the lack of involvement from brands and buyers in promoting the prototype through for instance marketing channels created a significant challenge for manufacturers trying alternative CSs. Circularity is currently valued only as long as it fits established business and operational models. As expressed by (D) CEO, "It is hard for us to push circularity to buyers; we always end up adopting their business model, which currently favors linear practices, even when they say they want circular products." Thus, engaging buyers in the experimentation process is essential, highlighting the need for a combined push-and-pull experimentation approach (Mante-Meijer & Losos, 2011).

6.4.2 Evaluation phase

6.4.2.1 Comparison of circularity' systems-change conditions

Table 6.2 compares companies' hard system aspects from before and after experimentation. It showcases the existence of improved practices (indicated in yellow and green dots) from the first assessment to the second one. This means that more system-change conditions are in place after experimentation. The Remanufacture CS showed the most significant changes at the structural level, which can be explained by the fact that this CS is less developed and, thus, with more room for improvements. Furthermore, seven companies successfully incorporated circularity principles in their production process. They adopted and adapted KPIs related to circularity and followed circular training. Additionally, waste generation indicators also improved in five of the cases.

Challenges remain in creating a specific employee function or role to ensure that circular strategies are properly and continuously implemented as only one company has an eco-designer in place. In terms of corporate culture, with more CE training and skillsets in place, circular capabilities are being developed in seven of the companies analyzed. Additionally, the need to implement eco-design as an overall approach became apparent in several businesses, with some wanting to expand it to other departments such as middle management, and sales team. As mentioned by (B), "We need to increase circular training beyond designing rooms because circularity is more than just design, is a whole approach, a philosophy, a way of doing things."

Finally, the piloting made evident that incorporating additional CSs, such as Repair and Remanufacturing for businesses that traditionally do Resale, is not a straightforward process. Labor-intensive CSs, like Repair and Remanufacture, take time and add value to products therefore require a higher price tag. However, the higher prices are not always aligned with the general consumer perception of secondhand products costing less, because they are not new. As expressed by (H), "It is hard to change that chip in people's minds from upcycled product to an upscale more expensive product." This highlights the need to consider consumers' behavior and mental models and implement consumers awareness and education campaigns on true cost of CE practices and why these matters.

Table 6.2 Comparison of Circularity' hard system aspects from first to second assessment. Source: self-elaboration based on Chapter 5, (Suarez-Visbal et al, 2024b).

Systems Aspects	System change levels	Relevant environmental aspects	FIRST ASSESSMENT										SECOND ASSESSMENT									
			C	B	A	D	E	I	H	J	G	F	C	B	A	D	E	I	H	J	G	F
HARD ASPECTS	STRUCTURAL LEVEL	Company by country color & Circular strategy	R2	R6	R7	R7	R3	R5	R4	R4	R4	R6	R2	R6	R7	R7	R3	R5	R4	R4	R4	R6
		System-change attributes																				
		More than 1 circular strategy in place																				
		Circularity training																				
		Circular Objective or KPI																				
	REL. LEVEL	Certification of Recycled or others																				
		Waste measurement																				
		Circular Infrastructure																				
		Have performed LCA or MFA																				
		Technology to improve CE in place (Sorting machine etc)																				
CORPORATE CULTURE	REL. LEVEL	Eco-designer in place																				
		Have active CE collaboration in place																				
		Sustainability mind set																				
		staff- sustainability understanding of job																				

6.4.2.2 Comparison between circular material indicators (hard aspects) before and after experimentation

Table 6.3 compares circular indicators of CS on the first assessment (upper chart) and second assessment (lower chart). Green signifies positive change, yellow no change and red negative change. The direction of the arrow signifies an increase or a decrease. When looking at the second assessment we can see that most CS were able to improve the current process (green arrow). Most variations are seen in Rental, whose reused material percentage increased almost by ten points. However, this change can only be partially attributed to our recommendation, since by the time of the experimentation this company was already undergoing some changes. Remanufacture saw a significant decrease in its percentage of reused material. This is due to the low quality of the inflow of reused material during the experimentation period. Companies implementing Remanufacturing had to deal with a fluctuating and uncertain quality of the reused material received.

A decrease in waste generated was observed in companies implementing Reduce, Rental, Repair and Recycle. This was due to better practices in quantifying and registering the use of material and the implementation of additional circular strategies. In the case of Rental, many products were also resold, and some materials were donated for repurposing and Remanufacturing. Finally, regarding recirculation, Rental is still the CS that extends the life of products the most. This was possible because of renting outfits several times, incorporating Repairs and then Reselling, and Remanufacturing outfits that cannot be rented as such anymore. This shows that combining several CSs is more effective than trying to implement a single CS in isolation.



Table 6.3 Comparison of circular indicators from first to second assessment. Green signifies positive change, yellow no change and red negative change. The direction of the arrow signifies an increase or a decrease. Source: self-elaboration based on Chapter 5 (Suarez-Visbal et al, 2024b).

First Assessment						
Circular Strategy	Reduce-R2	Rental-R3	Resale-R4	Repair-R5	Remanufacture R6	Recycle-R7
Influx % of new and second-hand material	100%			Product	Patch	
% Bio-material		89%	100%	98%	0%	84%
% of reused material						86%
% of recycled material					8%	14%
% Waste generation	6%	10%	17%	1%	23%	46%
Recirculation	# of times product is recirculated before EOL	1	9	2	2	2
Most wasteful process	Cutting and then QC	Re-used Clothing inventory dead-stock	Presorting, sorting	Cutting	Pre-sorting washing cutting	Sorting, cleaning cutting
Type of change						

Type of change

Positive change

No change

Negative change

6.4.2.3 System-change conditions (soft aspects) comparison

Table 6.4 shows the comparison of soft system-changes conditions between companies during the first and second assessment. In the dimension of quality of jobs (orange), we see some progress at the structural level. For example, an open salary policy is now implemented in four companies, while three different companies have started programs to equalize salaries. Also, a significant change is visible regarding written contracts with almost all companies (nine) having those in place. This should contribute to improving job security and access to social security benefits.

In the first assessment, most companies did not have worker's well-being or incentive programs in place (in pink). According to the second assessment, only two companies did not have such programs. In company (H), a holistic approach to well-being was implemented. It included reorganizing physical space, recreation, and meditation areas, incorporating anti-stress activities, and healthier free snacks for workers. Additionally, two more companies implementing Resale and Repair have adopted flexible schedules.

In terms of gender equality and inclusion GE&I (in purple), six companies have implemented positive changes. For example, some companies drafted a gender policy, while others implemented training against violence and harassment and in gender equality practices. Companies also shared resources with employees through newsletters or other internal communication.

The second assessment showed improvements in the field of communication mechanisms, such as the creation of official workers' committees, well-being committees, and consultative workers' spaces. Of the ten companies, only two companies (implementing Recycle and Reduce) had a consultative workers committee before the experimentation. During the second assessment, eight companies reported creating either special weekly workers' communication meetings or dedicated workers-feedback platforms, and, in two cases, an official workers' committee. This is a significant milestone as lack of voice and collective bargaining are critical challenges in CE implementation in the manufacturing, distribution and in the end-of-life segments.

6.4.2.4 Workers impact comparison

The heatmap in Table 6.5 compares the first and second assessments of workers' social impacts per company and per CS. Red and orange represent critical and significant challenges, while yellow and green represent not a priority and good practices, respectively. *Earning quality* and *job security* remained the most critical and significant challenges, followed by *social assets*, *voice & collective bargaining*. This can be partially explained by the short time

of piloting, in which many changes to improve job quality workers' well-being and GE&I were initiated but not fully functional at the time of the second assessment.

However, the outcomes of the second assessment showed tensions in the way companies addressed some social aspects. For example, although the gender pay gap across different CSs has been reduced, in some cases, *earning quality* for male and female workers ended up lower than in the first assessment (darker red). Two reasons can explain this result. First, some strategies like Reduce, Repair, and Remanufacture, employ vulnerable populations such as migrants and/or refugees that work in highly fluctuating seasonal shifts with high rotation rates. As a result, there is a constant flow of new workers starting their job at a lower salary scale. The second reason is related to the fact that several companies (in India) have negotiated deals with workers around written contracts. As explained by a manager (C): "Some workers prefer to get more cash and no contract than a lower pay and benefits with written contract." This trade-off shows how hard it is to improve salaries in the sector for both linear and circular business models, and what a critical role just transition policies play to ensure a fair level playing field for all workers.

Positive changes are evident in well-being (pink) where *social assets* related to how much workers interact with colleagues, community, and family. For example, well-being programs implemented by the companies that included incentives and/or flexibility programs, seem to have a positive impact in workers' social aspects, evidenced by the presence of lighter shades of yellow instead of orange or red (obtained in the first assessment). Workers (C07) explained, "It is nice that the company cares about our well-being; our working space has significantly improved. It feels much nicer; I think we feel more at home." Additionally, in GE&I *voice & collective bargaining* show a lighter yellow shade, which shows that the implementation of practices such as the creation of working committees or working on improving communication channels with workers does have a positive impact on workers' perception of their voice and participation.

This was also validated by a worker (F08): "I have never participated in any way before, but lately I have felt encouraged and motivated with the possibility of having a workers committee, I feel everyone cares now." Other changes were seen in training, *leadership opportunities* and sexual and reproductive health & rights shown by lighter shades of yellow and even some green in these two indicators. These changes can be attributed by the fact that many companies had given training about gender equality, *violence & harassment*, as well as training in circular practices.

Table 6.4 Comparison between soft attributes in first and second assessment. Source: self-elaboration based on Chapter 5, Suarez-Visbal et al, 2024b.

Systems Aspects	System change levels	Relevant social aspects	Company by country color & Circular strategy	FIRST ASSESSMENT										SECOND ASSESSMENT									
				C R2	B R6	A R7	D R7	E R3	I R5	H R4	J R4	G R4	F R6	C R2	B R6	A R7	D R7	E R3	I R5	H R4	J R4	G R4	F R6
SOFT ASPECTS	STRUCTURAL LEVEL	Quality of Job	Open SALARY position policy																				
			Health Security																				
			Equal opportunity																				
			Written contracts																				
			Permanent contract																				
			Equal salaries policy and practice																				
			Internal promotion																				
			Incentive program																				
			Training program																				
			Training budget																				
CORPORATE REL.	CULTURE LEVEL	Gender Equality and Inclusion Practices	Working hours (LEGAL OR EXCESS)																				
			Vacations																				
			Wellness program on place																				
			Incentive programs for wellness																				
			Transports subsidy/ pay card																				
			Child support/ child time																				
			Personal growth program training																				
			Other benefits																				
			Flexible schedule others																				
			Gender Policy on place																				
CORPORATE REL.	CULTURE LEVEL	Gender Equality and Inclusion Practices	Training on V&H																				
			Specific Role for Gender or Diversity																				
			Existence of Workers committee																				
			CAO adherence																				
			Gender + training for women workers specially																				
			Social mission values and mindset																				

Table 6.5 Workers social impact comparison from first and second assessment. Areas with biggest change are presented in bold squares.
Source: self-elaboration based on Chapter 5 Suarez-Visbal et al, 2024b.

		ASSESSMENT 1																			
Social impact dimension	Case Code by country color Principal CS	C		B		A		D		E		I		H		J		G		F	
		R2	R6	R7	R6	R7	R7	R3	R5	R4	R4	R4	R4	R4	R4	R4	R4	R4	R4	R6	R6
Quality of Jobs (QoJ)	Social Impact Principal CS	Social Impact indicator/Type of worker																			
	Earning quality																				
	Labour market security																				
Well-being	Work environment																				
	Human Assets																				
	Natural Assets																				
	Physical Assets																				
	Social Assets																				
Gender Equality and Inclusion (GEI)	Financial Assets																				
	Economic Opportunity																				
	Access to and control over resource																				
	Leadership & training																				
	Voice and Collective bargain																				
	Violence and harassment																				
Gender Equality and Inclusion (GEI)	Health and security																				
	Sexual and Reproductive Health and Rights																				

Table 6.5 Workers social impact comparison from first and second assessment. Areas with biggest change are presented in bold squares.
Source: self-elaboration based on Chapter 5 Suarez-Visbal et al, 2024b - Continued.

Social impact dimension		Case Code by country color		ASSESSMENT 2															
		C	B	A	D	E	I	H	J	G	F								
Quality of Jobs (QoJ)	Social impact indicator/Type of worker	R2	R6	R7	R7	R3	R5	R4	R4	R4	R4	R4	R4	R4	R4	R4	R6		
	Earning quality	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Labour market security	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Work environment	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
Well-being	Human Assets	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Natural Assets	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Physical Assets	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Social Assets	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
Inclusion (GEI)	Financial Assets	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Economic Opportunity	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Access to and control over resource	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Leadership & training	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Voice and Collective bargain	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Violence and harassment	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
	Health and security	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		
Sexual and Reproductive Health and Rights		Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male		

6.4.3 Baseline comparison

Figure 6.3 depicts the comparison between companies before and after experimentation with respect to system conditions and social and environmental impacts. Each company is represented by two circles with its letter code, a dotted one for the first assessment (i.e. baseline) and a full-colored one for the second assessment. Companies in India are depicted in green, in blue in the Netherlands and in yellow in Spain. The graph shows a line from 1 (laggards) to 4 (leaders). The closer to the 4, the better practices are in place.

From this visual representation, we can see that in almost all cases, a shift towards good practices was seen in all companies. Regarding system change conditions (represented by the trapezoid figures on the left-hand side of the graph), significant changes were seen on the three CE system-change levels, where practices such as improved CE measuring, improved CE infrastructure where implemented, and new CE training conducted which helps to develop CE skills.

With respect to the quality of jobs (QOJ), although the Dutch and Spanish companies started with a better baseline than the Indian companies, the biggest changes were observed after experimentation in India, where practices such as developing written contracts or implementing gender pay parity programs had more structural effects. Regarding well-being and GE&I, most companies across countries started with very few system-change conditions in place. After the experimentation, practices such as gender violence training, establishment of workers' well-being groups and committees, and improved channels of communication, were more present across companies.

In terms of impacts on *waste generation and influx of reused material*, changes were positive, but minor compared to the initial baseline. This could be explained by the fact that most companies have already started with good practices in place, which is not surprising as these are all circular companies in which some degree of circularity has already developed.

Regarding social impacts, even though improvements in system-conditions were already significant in terms of well-being and GE&I, this did not translate to an automatic positive impact for workers. For example, for quality of jobs, *low salaries* are still a major concern, in well-being, *social assets* are still low, and *voice & collective bargaining*, though better, are still far from good practices overall. This outcome justifies the need to incorporate a just transition lens, where new policies, programs, and resources should be developed along with workers to ensure they are accessible to them and relevant to their reality.



In fact, changes in the system should be made where they matter the most (for workers) and not necessarily where companies can most easily do something about it.

6.5 Discussion

6.5.1 STE intra-business experimentation and system-change

This study aimed at understanding how a company can transition toward a more transformative and just Circular Economy (CE) through experimentation. Our findings align with the assertion of Hofmann & Jaeger-Erben, (2020) that intra-company experimentation can drive broader organizational change, enhancing social and environmental performance. Conducting Sustainable Transition Experiments (STEs) for an inclusive CE led to various positive outcomes, including streamlining operations, energizing projects, and deeper exploration of negative impacts to identify root causes.

These outcomes resulted in changes at different levels within organizations. At the structural level, modifications of policies, internal rules, and practices were relatively easy to implement, as noted by Kania et al., (2018). This was the case for most businesses analyzed. Changes at the relational level, such as breaking down silos, strengthening communication, and creating worker well-being groups and committees, were also significant. These changes are crucial to embed inclusive practices more permanently, although they often require financial investment and longer-term planning beyond the six-month experimentation phase, which limited progress in this area.

Finally, while changes at the transformational level of corporate culture are essential for broader CE adoption, as highlighted by Bertassini et al., (2021), they were more challenging to assess within the short experimentation period. However, improvements in skills, training, and *leadership opportunities* observed in several businesses suggest a potential for long-term enhancement of circular capabilities. These findings demonstrate that combining Organizational Change for Circular Economy (OCCE) with systems thinking, just transition considerations, and experimentation can help businesses better identify socio-environmental challenges and opportunities for advancing their sustainability goals.

6.5.2 Tensions related to system conditions and socio-environmental impacts and Just Transition principles

Although progress was mostly observed at the Well-being and GE&I system-change level, improvements in these dimensions did not immediately translate into positive impacts for all workers to the same degree. This gap can be

explained by two main factors. First, as Benschop & Verloo, (2010) suggest, changes in gender equality norms and structures are slow and take time, but they do happen if they are supported by actionable practices, so long-term reassessment of outcomes is therefore critical. Second, blue-collar workers do not often see the workplace as a place to improve well-being or gender equality advancement. As Bierema, (2003); Gürol Y & Cömert, (2024) noted, especially women in blue-collar jobs often have low awareness of gender issues like discrimination or wage gaps, which complicates efforts to address and discuss these topics in the workplace. As a result, they undermine the importance of these issues.

From a JT lens it is critical to identify i) the mechanisms -that constrain or enable change-like improving communications channels with workers and enabling voice and representation. ii) Which workers are most vulnerable and how they are affected with the CE transition. When zooming-in female and informal workers resulted as the most vulnerable workers in 7 of the 10 business cases. Therefore, piloted recommendations to address their vulnerability (such as reduce pay-gap, increase salary, improve voice & collective bargain) were proposed but proved hard to get fully implemented across businesses.

Another tension related to formalizing jobs and wages was present in several companies. *Informal work* often came with higher (although still low) immediate pay compared with *formal employment* but with no *job security*, nor *voice* or *collective bargaining*. While formal employment resulted in upfront lower pay but with *job security*, social and health benefits. As put by Chen et al., (2017), many blue-collar workers struggle to think long-term or plan for unforeseen circumstances due to their present low wages, which narrows their focus to immediate financial needs and forgoes critical aspects such as future well-being. As a results most vulnerable workers are asked to make a choice between two options that are not good for them and enter a lock-in situation.

This tension highlights the importance of i) enabling workers' rights training and family well-being literacy to ensure their choice is rooted in this knowledge. ii) consider local socio-cultural factors when discussing with workers their choices and their preferences. iii) upholding living wage as a non- negotiable right. If people are dependent on the higher informal wages, they are not free to choose the long-term benefits, even if they do understand them. From a just transition lens, regional and national labor policies play a pivotal role in guaranteeing that -regardless of work agreements- workers have access to and enjoyment of at least social security and health benefits, particularly informal workers.



6.5.3 Socio-environmental impact assessment and its relevance for OCCE

Chiappetta Jabbour et al., (2019) and Bertassini et al., (2021) have argued that human-centered aspects of firms—like culture, and green human resource practices (CE skilling, incentives etc.)—positively influence the adoption of circularity at the organizational level. Our research provides empirical evidence supporting this claim, showing that socio-environmental improvement can be achieved without compromising either social or environmental aspects. This challenges the common belief in corporate sustainability that trade-offs between social and environmental goals are always inevitable. Our findings suggest that when CE practices are implemented with a clear dual focus on both social and environmental impacts, these trade-offs can be minimized, enabling progress in both areas.

By integrating Organizational Change Management for CE with concepts of just transition and systems thinking, this study identifies key intervention points within businesses that can foster learning and adaptation to achieve sustainability goals. The research also expands the traditional focus of CE to include social dimensions like job quality, gender equality, and inclusion, shifting away from a purely environmental perspective.

Through ten case studies in the TAVC, the study demonstrates how CE experimentation can lead to improved social and environmental outcomes. It highlights the use of Sustainable Transition Experiments (STEs) as a structured approach to drive systemic change in businesses, addressing a gap in the literature by evaluating businesses impact on both organizational systems and socio-environmental sustainability objectives.

6.5.4 Limitations and future research

The limitations of the research relate to the scope, duration of the experimentation, and sample size. First, due to rampant informality prevalence in the sector, which causes a high turnover of personnel in many cases, it was challenging to ensure participation of the exact same group of workers in both pre- and post-experimentation assessments. The turnover may have influenced the results. Also, because of the geographical dispersion of the sample and difficulties in accessing reliable data, the MFA was limited to material flows, excluding water and energy flows. Future research should aim to include these factors to provide a more comprehensive view of all relevant flows.

In addition, a more comprehensive environmental analysis, such as life cycle assessment, could be implemented to better understand the environmental impacts (or benefits) of implementing the recommendations. Furthermore, as experiments happen in real time, some recommendations were already aligned

to circular companies' on-going effort to implement circularity. As a result, the change identified in some companies might have been influenced also by the ongoing efforts and not only as an outcome of experimentation.

Second, while this study aimed to gain significant insights, the size and geographic distribution of the sample present limitations. Future research could explore a larger sample of companies, and include companies that are not front-runners of circularity, but rather adapted to the linear model or with a greater number of workers, to achieve statistical significance and enhance the potential for generalization. It could also replicate STEs at various levels, involving not only companies, but also buyers, policymakers, and consumers.

Finally, the six-month experimentation period was too brief to observe significant changes in workers' impacts. The study could therefore only indicate potential trends rather than definitive long-term outcomes. Future research should focus on conducting longer-term experiments to better capture changes over time. In addition, longer-term experiments could also help to understand which measures permeate through the organization and become a new way of working, instead of a temporary change.

6.6 Conclusions

This study aimed to understand how a TAVC companies' organizational system transitions to more transformative and Just CE practices through structured experimentation. To address this objective, this research undertook mixed method research based on ten STEs that ran over six-months with ten companies across three countries. Findings highlight that intra-business experimentation is crucial to advance circular practices, leading to an increase in system-change conditions, and improved social and material environmental outcomes.

STEs proved effective in enabling transformative and Just CE practices, with key progress in environmental system-changes practices, such as improved CE measurement and CE- focus training which supported material circularity without social trade-offs. Social Changes were most pronounced amongst Indian companies where shifts were supported by new policies like written contracts and gender pay parity, while Spain and the Netherlands saw positive shifts through workers committees, well-being groups, anti-violence training, and improved communication channels.

Despite these advancements, the study highlights ongoing tensions between system change improvements and direct socio-environmental benefits for

workers. While systemic changes in well-being and GE&I conditions laid a foundation for positive impacts, challenges such as persistent low salaries, limited collective bargaining, and a reliance on informal work underscore the need for continued efforts toward fair and accessible work environments. To bridge these gaps, worker involvement in program development and awareness of social-security rights is essential as well as local and national labor policies that ensure basic social protections while advocating for living wages.

The societal relevance of this chapter lies in providing evidence on how companies can integrate circular practices and social impacts, offering practical guidance for inclusive CE strategies. By focusing on corporate culture, fair labor practices, worker engagement, skill development, and context-specific approaches this study provides policymakers and business leaders with insights for creating inclusive CE policies that prioritize a Just Circular Economy Transition.

Finally, this research advances CE literature by integrating systems thinking and just transition principles with OCCE. The business cases demonstrate that CE practices can align social and environmental sustainability, challenging the view that these goals are inherently conflicted. However, neglecting the social dimension risks perpetuating inequalities. A holistic approach, combining organizational change with just transition principles, is crucial to embed CE deeply within organizations leading to long-term resilience.

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"If they don't give you a seat at the table, bring a folding chair."

Shirley Chisholm

7

Weaving a Transformative Circular Textile Policy Through a Socio- Environmental Justice Lens.

This chapter is based on Suarez-Visbal, L.J.; Calisto Friant, M; Harri, A; Vermeyen, V; Hendriks, A; Corona, B; Rosales Carreon, J. (2024). Weaving a Transformative Circular Textile Policy Through a Socio-Environmental Justice Lens. In: Galende Sánchez, E., Sorman, A.H., Cabello, V., Heidenreich, S., Klöckner, C.A. (eds) Strengthening European Climate Policy. Palgrave Macmillan, Cham.

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Policy Highlights

To achieve the recommendation stated in the title, we propose the following:

- Tackle overproduction and overconsumption in the EU Strategy for Sustainable and Circular Textiles.
- Address the impacts of EU Circular Economy Textile policies on the Global South from both SSH and STEM perspectives to ensure positive social and environmental outcomes.
- Make just transition policies globally accountable and alleviation mechanisms integral to the Textile Strategy rather than supplementary corrective measures.
- Include meaningful participatory mechanisms that ensure the democratic inclusion of different voices and actors.
- Reverse the burden of proof and provide educational, financial, and legal assistance accounting for multiple vulnerabilities (e.g., gender or type of worker).

Keywords: Circular Economy (CE)· Planetary boundaries· Environmental justice· EU textile strategy· Sustainability policies

7.1 Introduction

The way we produce and consume has a significant impact on both the environment and society. We are already overshooting six of the nine planetary boundaries (Richardson et al., 2023), risking irreversible environmental degradation and jeopardizing the well-being of current and future generations. To address this, the Circular Economy (CE) concept is becoming a crucial narrative guiding international, national and sectoral sustainability policies.

The European Union, as one of the world's largest economies, significantly influences global environmental and social conditions. One critical sector targeted by the European Green Deal is textiles, given that this sector ranks fourth for the highest impact on the environment and climate change, the third highest for water and land use, and fifth for primary raw materials (EEA, 2022). Additionally, from extraction to end-of-life, the textile sector remains labor-intensive, providing millions of jobs to workers in Europe and the Global South, where most textiles are produced, and most textile waste is exported (Köhler et al., 2021). Furthermore, the sector is highly feminized, as women are overrepresented in the lowest-paying jobs (Fletcher & Tham, 2014).

The European Commission has developed a new EU strategy for sustainable and circular textiles to address these critical sustainability challenges. It aims to harmonize the European Green Deal, the Circular Economy Action Plan, and the European industrial strategy to develop a greener, more competitive textile sector. Despite these ambitious plans, there is a lack of research on the socio-ecological implications of these policies from a social and environmental justice perspective. This study addresses this research gap by answering the following question:

How can EU textile policies enable the transition to a fair and sustainable circular society?

To answer this question, we analyzed the EU Textile Strategy and 9 of the 25 actions in its annex namely the directives, regulations or communications with direct policy relevance. The remaining actions were either still in development and thus unavailable or were reports and working documents that did not evidence the EU's current policy. Further, we included the Just Transition Fund (Regulation (EU) 2021/1056), even though it is not part of the annex of the EU Textile Strategy. We analyze in total 11 EU policy documents (see Annex 7.1)

The insights from our analysis are particularly relevant for policymakers at the European Commission and researchers interested in CE governance.

The analysis consisted of three steps:

1. **Literature review** of policy research on the circular transition in the textile industry in the Social Science and Humanities (SSH) and Sciences, Technology, Engineering and Maths (STEM) fields.
2. **Co-development of an interdisciplinary analytical framework** based on environmental justice, CE, sustainability, and post-growth literature applied to the textile sector. The framework was developed during a co-production workshop, where all chapter authors combined the insights from their specific SSH and/or STEM fields in a comprehensive interdisciplinary approach. The framework considers four justice dimensions, namely recognitive, distributive, procedural, and restorative, as well as environmental boundaries. For each dimension, a set of questions was created to evaluate the policies, which can be found in Annex 7.2 (See DOI: 10.5281/zenodo.10847421).
3. **Application of the interdisciplinary framework** to the chosen policies. Each policy's findings related to each dimension were summarized in an Excel sheet and color-coded based on adequacy. Through an iterative process, multiple authors collaborated to analyze and discuss the policy documents collectively. Annex 7.3 contains the full analysis (See DOI: 10.5281/zenodo.10839063).

7.2 Analytical framework

Our interdisciplinary analytical framework contributes to developing a transformative and Just CE Transition in the textile value chain. A transformative CE could become a driver for systemic change away from present unsustainable production and consumption structures. A technical shift and a shift in values, behaviors, and institutional structures are needed to create a more regenerative, democratic, and equitable system. A transformative CE should empower the most vulnerable people and allow all humans to shape their society and future equitably (Calisto Friant et al., 2023 and Chapter 4 Suarez-Visbal et al., 2024b).

Academics studying social and environmental justice have identified four core dimensions, namely recognitive, distributive, procedural, and restorative justice (Abram et al., 2022). Recognitive justice is about who is recognized in a socio-ecological transition. It seeks to ensure that the views of the most marginalized people are heard and recognized (Parsons et al., 2021). Distributive justice looks at the distribution of benefits and harms resulting from socio-ecological change. Procedural justice asks what procedures can prevent the creation or

reproduction of injustice in transitions or bring justice to harmed communities. Restorative justice is about Repairing harm caused by specific behavior both on the social and ecological sides (McCauley & Heffron, 2018).

We added a fifth dimension to reflect the environmental boundaries of the Earth and the key role that more-than-human nature plays in a just transition (Sharpe et al., 2023). The dimension recognizes that human beings are an integral part of nature, and that nature is a subject of rights. A just and sustainable CE transition occurs when all five socio-ecological justice and sustainability dimensions are integrated, revealing multiple tensions and trade-offs that must be addressed and negotiated.

7.3 Analysis of relevant EU policies

This section describes the main insights from analyzing the 11 selected EU policies.

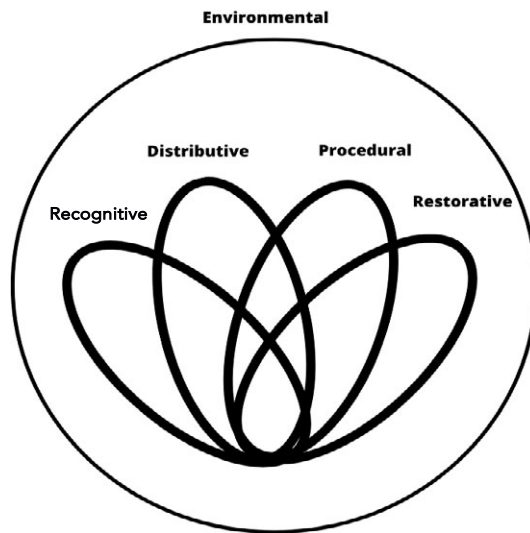


Figure 7.1 Interdisciplinary analytical framework combining five interrelated and interconnected dimensions of socio-environmental justice (modified from Härrä and Levänen, 2024).

7.3.1 Environmental dimension.

The environmental dimension is present through initiatives to promote greater transparency to consumers regarding the impact of production and consumption or through the promotion of strategies on the value-retention hierarchy. However, higher value strategies such as refuse and reduce are largely missing.

Furthermore, no policies address the root causes of negative socio-ecological impacts, like overproduction, overconsumption, and excessive advertising (Sharpe et al., 2023). Although the EU CE Textile Strategy acknowledges that textiles are overproduced and overconsumed, none of the policies underlying the strategy address this.

While some policies mention planetary boundaries, none recognize that the EU lives beyond its fair share of planetary resources. The policies lack clear targets and limits to reduce overall environmental impacts, so the EU's footprint would fall within sustainable planetary boundaries.

7.3.2 Recognitive dimension.

Together, the policies will have a considerable impact on various stakeholders outside of the EU, as the majority of clothes sold in the EU are made in the Global South. Unfortunately, this is not adequately recognized in the policies.

Many people in the Global South are in vulnerable positions and lack resilience, especially workers in low-paying sectors (such as women and migrants) and people with limited access to education or upskilling. Some actors hold simultaneous vulnerabilities, such as being female, a refugee or an undocumented waste picker. Furthermore, these vulnerabilities could be exacerbated depending on each country's labor security structure (Suarez-Visbal et al., 2022b).

The Due Diligence Directive is the most inclusive of the analyzed policies. It recognizes the vulnerabilities of several actors but could benefit from explicitly recognizing vulnerable countries, informal workers, ethnic minorities, and agricultural workers. These groups lack adequate recognition across all analyzed policies. Informal workers are critical and need to be included as they are likely the most affected by e.g. the delocalization of the industry to the Global North. Moreover, there should be more provisions to include women across the different policies. In some policies, they are simply mentioned, but no tangible actions are taken to address their vulnerability.

Furthermore, most policies exclude Small and medium-sized enterprises (SMEs) from responsibilities and risk the significant impacts caused by SME's remaining unaddressed. Instead of exclusion, financial and technical support is needed to help them comply. The policies fail to account for the multiplicity of vulnerabilities and the multidimensional and contextual nature of discrimination, exploitation, and alienation. They provide an EU-centric idea of sustainable textiles that lacks alternative visions of the future, especially from affected peoples and ecosystems in the Global South.

7.3.3 Distributive dimension:

The policies have an unfair distribution of costs and benefits that will likely disproportionately affect the most vulnerable. Current policies focus mainly on severe social and environmental impacts (like forced labor) but do not challenge unsustainable business models and purchasing practices that foster social and environmental impacts in the value chain.

Although quality jobs are mentioned in 8 of the 11 policy documents, there is no comprehensive definition of what this entails, especially for workers outside the EU. Such a definition should include living wages, well-being, work-life balance, non-discrimination, collective bargaining and inclusiveness.

The amendments to the Waste Directive underestimate the significant impact caused by implementing these policies on the Global South. By not including SMEs or adequately recognizing marginalized workers and textile waste pickers in the Global South, EU policies risk negatively affecting their livelihood. As textile waste currently ends up in the Global South, the eco-modulation of the Extended Producer Responsibility (EPR) fee should be increased to allow for the full and sustainable recovery of these wastes, regardless of where they end up (Thapa et al., 2022). If textiles are exported for re-use or recovery in the Global South, they should be accompanied with financial and technical resources to ensure a second life or proper disposal.

The Green Deal considers the Just Transition Mechanism (JTM) as a means to address the asymmetries of the zero carbon and circular transition. However, the EU Textile Strategy does not consider it an integral action. An extended globally accountable JTM could be incorporated into the policy package of the EU textile strategy. Additionally, a harmonized classification of 'green activities' enabled through the 'European taxonomy' should include environmental and social criteria in their evaluation, as the Trade Union Confederation (ETUC) and several NGOs have already expressed.

7.3.4 Procedural dimension

Our policy analysis revealed that throughout the 11 policy documents, there are very few participatory mechanisms to ensure that different actors are democratically included and given decision-making power in their transposition and implementation. There are also very few education and empowerment mechanisms that encourage greater understanding and participation of all voices.

Some policies establish consultation bodies, such as the eco-design forum of the Eco-design Regulation and the Committee established by the Directive

on Empowering Consumers for the Green Transition. Moreover, some policies require third actors to carry out participatory mechanisms, such as the Due Diligence Directive, which asks companies to ensure stakeholder engagement while carrying out their due diligence duties. However, these participatory mechanisms are poorly described and defined in these policies. They may become simple ticking-the-box exercises and consultations that give very little tangible power for affected people to shape the decisions that affect them. The current policies are thus unlikely to ensure that the voices of the most marginalized are truly heard and have decision-making power.

7.3.5 Restorative dimension

There is little to no support for Global South to adapt to the multiple new provisions set by the policies of the textile strategy. Yet these policies will likely greatly impact the most vulnerable suppliers, farmers, and formal and informal workers in the Global South, who will have to change their production practices and fulfil new administrative requirements. In addition to this, EU policies do not sufficiently encourage companies to transform their unsustainable purchasing practices and business models. Fast fashion strategies paying very low prices to producers and often forcing workers to overwork to fulfil short-term orders will thus likely continue. In these conditions, there will probably be little real transformation in textile value chains as the root causes of these socio-ecological problems are not addressed.

Furthermore, the legal liability for companies that commit social and environmental impacts is weak in the Due Diligence Directive because there are few tangible mechanisms to ensure access to justice for affected people, and there is no reversal of the burden of proof (affected people have to prove that a company has violated their human and environmental rights). This is especially problematic for the most vulnerable, marginalized, and discriminated people in the Global South, who often lack the knowledge, awareness and financial resources to uphold their social and environmental rights.

7.4 Conclusion and recommendations

The 11 analyzed policy instruments are an ambitious first step of policy commitment toward circularity. However, more emphasis must be placed on the scope, breadth, and depth of the actions proposed to generate tangible socio-ecological changes in the textile sector. This could be achieved with a “Transformative CE lens” as explained in Chapter 4 that redresses imbalances in the linear economic system, ensuring these legislations are truly fair, democratic, and sustainable. Though bridging the methodologies of STEM and SSH disciplines can pose communication barriers, the diverse perspectives

ultimately cultivate synergies that drive progress and address complex challenges with depth and breadth.

More specifically the EU policies should acknowledge that current overproduction and overconsumption patterns are the root causes of current socio-ecological problems. The EU should establish clear targets and limits to reduce textile overproduction and ensure its ecological footprint stays within planetary boundaries.

There should be an increased recognition of the multiple lived realities and vulnerabilities of stakeholders affected by EU legislation (both within and outside the EU). This will help ensure that EU policies truly recognize the implications of their policies on marginalized, discriminated, and exploited people and establish sufficient mitigation measures to address them. A way to address this is by collecting disaggregated data on multiple vulnerabilities (e.g., gender, type of worker, etc.).

Since the current JTM fails to consider the global dimension, a globally accountable JTM should be incorporated into the policy package of the EU textile strategy. Moreover, the policies of the strategy are not sufficiently discouraging unsustainable business models and fast fashion - the key drivers of socio-ecological problems in the sector (Sharpe et al., 2023). It is thus key for the EU to provide greater financial, technical, and technological assistance and support for suppliers and countries in the Global South to transform their production practices sustainably.

Moreover, textile EPRs should have global accountability to cover all regions where EU textile waste is currently exported. This will ensure a collective Global responsibility to sustainably handle textile waste, regardless of where it ends up.

We found a general lack of sufficiently diverse stakeholder engagement and participation throughout all policies, especially including perspectives from marginalized people. EU policies should include meaningful participatory mechanisms to ensure that different voices are democratically included and given decision-making power (such as citizen assemblies and greater engagement with vulnerable people in the textile value chain). Such mechanisms should minimize asymmetries in power between different stakeholders and ensure the empowerment of the voices, interests, and visions of the most marginalized peoples from the Global North and South alike.

There is a general lack of access to justice and reparation for socio-environmental harm caused by EU companies in the Global South. To address this, EU policies should reverse the burden of proof so that affected stakeholders do not face unsurmountable legal challenges to prove their case. Moreover, the EU should provide educational, financial, and legal assistance to ensure access to justice for affected people.



***"L'amour a tous les droits, et nous tous
les devoirs"***

Ismaël Lô, Jammu Africa

8

Conclusions

In this chapter the results of each of the research questions are discussed (section 8.1) and integrated to answer the main research question (8.2), followed by discussing the implications of the research on society and science (8.3), general reflections (8.4), and suggestions for next steps in research and practice (8.5).

8.1 Answer to research questions

This dissertation explored how circular practices across different countries can transform labor conditions, promote economic inclusivity, while also contribute to environmental sustainability in the Textile and apparel value chain (TAVC). It addressed the lack of social and justice considerations in the CE transition, and its systemic implementation at the business level. This thesis used a transformative mix-methods approach that blends gender, just transition, and systems-change lenses across six phases.

The research was structured around a main research question (MRQ) and five questions (RQ), each one addressing a critical component of the overall research question. The main research question that guided this research was:

How can the TAVC improve the social impacts of circular practices through an inclusive and Just CE transition?

Research questions (RQ)

RQ1: *How can the social impacts of the Circular Economy be assessed from the workers' perspectives in the TAVC?*

RQ2: *How do circular strategies implemented by TAVC businesses in different countries affect workers in terms of job quality, well-being, and gender equality and inclusion?*

RQ3: *How could transformative circular futures inform industry and policymakers to improve the social impact for workers involved in circular strategies in the TAVC?*

RQ4: *How do Circular businesses on the TAVC implement inclusive and just circular practices through experimentation?*

RQ5: *How can EU Textile Policies enable the transition to a Just and Sustainable Circular Sector?*

RQ1 addresses the lack of knowledge on how to identify and assess the social dimension of circularity in the sector. RQ2 addresses the lack of evidence of existing social impacts across different countries and their implications. RQ3 explores more alternative visions to improve the social uptake of circularity both for policymakers and businesses alike. RQ4 explores how these visions

can be implemented in practice by applying sustainable transition experiments (STE). Finally, RQ5 explores and proposes systemic policy changes based on just transition principles. The findings of these RQs helped to prioritize both social and environmental considerations and, in this way, advance towards a more inclusive and just circular transition in the sector. In the following paragraphs, the key findings for each RQ are presented, concluding with the answer to the overall research guiding question MRQ.

RQ1: How can the critical social impacts of the Circular Economy be assessed from the workers' perspectives in the TAVC?

The first research question addressed the lack of knowledge about the social impacts of circularity in the TAVC and the methods to assess the impacts. This is critical to understand which are the most relevant social impacts when circularity is applied and how they can be improved. Findings include three main insights: first, the social ambition of current CE practices in the sector is low. Second, Quality of jobs, well-being and gender equality and inclusion, are the most relevant dimensions for CE implementation in the sector. Third, it is possible to assess these dimensions with a gender disaggregated and an intersectional approach by building on adapting existing frameworks. This resulted in the development of SIAF-CE $\text{\textcircled{R}}$, the social impact assessment framework for circularity. By integrating intersectional data, the use of SIAF-CE $\text{\textcircled{R}}$ made visible hidden inequalities that are often overlooked in stand-alone assessments. This knowledge improves understanding of the potential social impacts of circular practices and helps to identify and address asymmetries prevalent in the TAVC. The SIAF-CE $\text{\textcircled{R}}$ framework is also used to address RQ2.

RQ2: How do circular strategies (CSs) implemented by TAVC businesses in different countries affect workers in terms of job quality, well-being, gender equality, and inclusion?

The second research question addressed the lack of knowledge of social impacts of different circular strategies implemented by different types of businesses in the Netherlands, Spain, and India. This knowledge is critical as it helps to see whether circularity is at risk of replicating patterns of exacerbated poverty, gender inequality, and lack of worker participation, present in the traditional linear economic model. Through 90 interviews and 210 worker surveys, it brought forward evidence of current social impacts in different countries of the TAVC applying different circular strategies. These findings bring three main insights: first, CE implementation by businesses is still nascent, with weak social performance. For instance, SME & startups showed significant gender pay gaps and incumbent firms presented limited progress on social inclusion. Workers implementing circular strategies across all countries reported low wages, financial insecurity, and poor work-life balance, particularly in India,

where voice & *collective bargaining* and violence harassment protections were notably weak.

Secondly, informal migrant women workers in the CS of Repair, Remanufacturing, and Recycling are the most vulnerable in the sector. These strategies are not only labor-intensive but also essential for the broader adoption of circularity in the sector. Third, this research found evidence that CE jobs often replicate the low working conditions and inequalities in the linear economy, especially in India, with the Netherlands and Spain performing only slightly better. These findings highlight the urgent need for more socially inclusive CE policies and practices to ensure fair opportunities and protection for workers, particularly the most vulnerable workers. More alternative co-created visions, that can contribute to this aim were explored through RQ3.

RQ3: How could transformative circular futures inform policymakers and industry to improve the social impact for workers involved in circular strategies in the TAVC?

The third research question addressed the lack of transformative (co-created, diverse, and socially rich) future visions of CE implementation in the sector. This knowledge is critical, because future visions are commonly used to inform policy frameworks and bring fresh alternative narratives of change (Andersson, 2018; Candy & Dunagan, 2017; Edwards, 2010; Miller, 2018; Weigend Rodríguez et al., 2019). It answered this question by pioneering the Transformative Circular Futures (TCFs) concept, emphasizing the co-creation of socially rich future CE visions tailored to regional needs. This process provided the following main insights.

First, local and diverse participation is critical to create alternative narratives that show diversity in social outcomes, such as improved job quality, prevalence of workers' well-being, and achievement of gender equality. For example, Dutch TCFs advocate for the formalization of living wages and the establishment of flexible work. Spanish TCFs focus on closing gender pay gaps once and for all. Meanwhile, Indian TCFs focused on reaching universal health coverage, collective bargaining, informal labor recognition, and reskilling. A common denominator in all three countries was the imperative to incorporate worker's voices related to circular jobs along the TAVC.

Second, critical "glocal" (global-local) tensions also emerged in the TCFs, with varying regional attitudes toward growth-degrowth, high-tech vs. artisanship, and the minimum wage vs. living wage standards. This finding recognizes the relevance of incorporating diverse voices (regarding geographies and types

of workers) zooming into the local and zooming out to the global aspect when creating inclusive CE roadmaps in a sector.

Finally, applying backcasting techniques to the TCF narratives also helped to develop transformative recommendations for policymakers and businesses to advance toward a more just and inclusive CE Transition. These findings highlight the bearing of geographical diversity and workers' inclusion to inform CE policy and industry with a more all-inclusive approach that takes into consideration the "glocal" spectrum of the TAVC. Diverse visions bring different lived realities and call for a more holistic CE practice and CE policymaking approach. The business recommendations from this process were adapted and tested across different businesses as part of the research conducted on RQ4.

RQ4: How do Circular businesses on the TAVC implement inclusive and just circular practices through experimentation?

The fourth research question explored the lack of empirical knowledge on how circular businesses in the TAVC implement inclusive CE practices through experimentation. Understanding this is crucial to i) better integrating social and environmental considerations into CE business transition and ii) identifying key socio-environmental priorities for a more transformative implementation of CS in the sector. To answer this, we analyzed ten circular companies in the Netherlands, Spain, and India through a two-phase process.

In the first phase, we established a socio-environmental baseline. Findings showed that SMEs applying circular strategies such as Reduce, Rental, and Repair demonstrated higher material efficiency than linear models, confirming CE's potential for improving environmental performance at the SME level. However, social considerations remained largely unaddressed. Persistent issues such as low wages, weak collective bargaining, and limited attention to workers' sexual and reproductive health rights reinforced previous research (BSR, 2021; Pugh et al., 2024; Repp et al., 2021) and provided evidence that circularity alone does not improve working conditions. For a real inclusive CE paradigm shift to happen businesses must integrate social considerations into their current CE strategies.

Another key finding was the lack of systems-thinking across all analyzed businesses. Most lacked critical system-change enablers at multiple levels: structural gaps (CE metrics, policies, and training), relational gaps (roles like circular managers and diversity officers), and cultural gaps (corporate values aligned with CE principles). These gaps suggest that businesses are yet insufficiently equipped to manage an inclusive circular transition. Addressing these challenges requires integrating systems-change practices

into management and operational roles, including HR, CSR, CE functions and corporate culture.

The second phase involved six-month Sustainability Transition Experiments (STEs) tailored to each company, based on recommendations from Chapter 4. Post-experimentation, nearly all companies showed socio-environmental improvements. CE practices advanced, including material efficiency and metrics use, while social outcomes also improved. Indian businesses introduced written contracts and gender pay parity programs, while Spanish and Dutch firms strengthened worker committees, well-being groups, and anti-violence training. The research also underscored the need for explicit assessment and prioritization of social impacts. While early-stage circular businesses saw the most significant gains, all companies demonstrated progress, particularly in internal policies, programs, and resource allocation, followed by relational and cultural changes. These results confirm that achieving both social and environmental benefits is possible when businesses adopt more inclusive circular practices.

Despite the observed progress, measuring long-term worker impact remained a challenge within the evaluation period. Structural barriers -such as low wages, reliance on informal labor, and weak collective bargaining, especially in India—persisted. Overcoming these barriers requires coordinated sectorial policy intervention beyond Europe. A Just CE Transition demands not only business-led initiatives but also robust regulatory frameworks across the value chain to support them. RQ5 further explores the need for a holistic policy approach to address these ongoing challenges.

RQ5: How Can EU Textile Policies enable the transition to a Just and Sustainable Circular Sector?

The fifth research question addressed the lack of a justice policy lens for the CE Transition in the TAVC. This knowledge is important as policy is often seen as the compass that guides the CE transitions (Köhler et al., 2019). Making sure this compass has justice considerations implicit in its aim and form is critical to advancing a CE that aims to leave no one behind. This question was answered by analyzing 11 policy instruments under the EU Green Deal's Circular Textile Strategy through a transformative, just-transition CE lens, integrating STEM and SSH perspectives.

The main findings revealed significant justice gaps, including the neglect of global supply chain impacts, the lack of gender-disaggregated data, and inadequate and insufficient mechanisms to address overproduction and overconsumption. Current Just Transition Mechanisms (JTM) and Extended

Producer Responsibility (EPR) regulations are regionally limited, failing to account for the global nature of the textile sector and neglecting marginalized voices from the Global South. Additionally, measures to reduce power asymmetries, empower vulnerable stakeholders, and provide restorative support such as financial, legal, or educational aid were lacking.

To enable a just circular transition this research advocates for restorative, globally inclusive policies that ensure fair labor practices, social protections, and equal opportunities for workers in both the Global North and South. By applying a transformative CE lens, it emphasizes the need for democratic, participatory policymaking to drive systemic change. The study highlights the importance of equitable resource allocation and restorative justice in empowering marginalized Global North and South stakeholders.

8.2 Improving the social impacts of circular practices through a Just and Transformative CE Transition

This thesis provides a multidimensional understanding of how the CE transition can address social inequalities and justice considerations while promoting environmental sustainability. It also provides nuanced geographical evidence on the impact of circular strategies on vulnerable workers and delivers practical tools, frameworks, and insights to support policymakers, businesses, and stakeholders in fostering a just inclusive CE transition.

As the TAVC is global, complex, and highly fragmented, the implementation of CE across the sector has been found to be patchy, nascent and lacking harmonization. In this context, addressing how the TAVC can improve the social impacts of circular practices through an inclusive and Just CE Transition involves multiple strategies and considerations at various levels. As this thesis focuses on the production side; it engages primarily with businesses and policymakers. The research identifies key CE labor concerns from workers' perspectives— such as job quality, well-being, and gender inclusion—. It also provides empirical evidence on how circular strategies affect different worker groups, exposing inequalities and revealing that social injustices from the linear economy continue to exist despite the implementation of circularity. The research shows that informal, migrant, and female workers in Repair, Remanufacturing and Recycling, are the most vulnerable. These labor-intensive circular strategies are also critical for circularity uptake, as supported by Dissanayake & Weerasinghe, (2022); Llorente-González & Vence, (2020); Singhal et al., (2020); and Turner et al., (2019). Improving their social impact is pivotal to ensure a just CE transition for workers in the sector. As a way to address the urgent need for more transformative approaches, the thesis co-

created TCFs future scenarios with a variety of stakeholders, informing forward-looking, context-specific recommendations for policymakers and businesses that emphasize worker inclusion and well-being in CE roadmaps.

At the business level, the research validates the feasibility of these recommendations, demonstrating that social and environmental CE goals can be pursued simultaneously. At the policy level, it identifies justice gaps and proposes Just Transition policies that account for global and local contexts, job diversity, and worker vulnerabilities. The policy recommendations emphasize:

- i) Recognizing that overproduction and overconsumption are key drivers of current socio-ecological crises and thus require establishing limits on textile production.
- ii) Aligning justice mechanisms to extend beyond the EU, incorporating a globally accountable just transition Mechanism (JTM) and stronger Extended Producer Responsibility (EPR) frameworks that ensure financial, technical, and technological support for suppliers and Global South countries, ultimate responsible of textile waste disposal.
- iii) Enabling just transitions mechanisms that integrate social stakeholders—workers, labor unions, and NGOs—into CE policy and industry negotiations to democratize decision-making processes.
- iv) Recognizing that SMEs are key employers in the sector and therefore require targeted just CE transition regulations that support their social impact ambitions. This includes accessing circular reskilling programs, incentivizing gender-disaggregated social impact reporting, and providing financial and technical assistance to further these purposes.

8.3 Scientific and societal contributions

This research makes several key contributions to advancing the understanding and application of CE practices in the TAVC:

8.3.1 Contributions to science

CE has been studied mainly from the economic and environmental perspectives (Kirchherr et al., 2017). To complete the nexus of CE with sustainability, this thesis contributes to the knowledge of the social dimension of CE in several ways. First, this thesis develops the SIAF-CE \mathcal{Q} , a framework for assessing CE's social impacts. The SIAF-CE \mathcal{Q} helps to identify and mitigate socio-environmental trade-offs across different value chain stages, geographies, and worker types. By implementing this framework, this thesis also presented evidence of CE social impacts from three countries—Netherlands, Spain, and India. The findings highlight critical risks of perpetuating inequalities when

the social dimension is overlooked. By centering the lived experiences of workers—particularly those in vulnerable, informal, and gendered roles—it offers a unique bottom-up view of CE impacts, ensuring that marginalized voices are prioritized in CE transitions.

Second, the introduction of Transformative Circular Futures (TCFs) enhances the understanding of CE's future pathways by combining desirable futures, social transformation, and systems thinking. This approach underlines the importance of integrating social inclusivity and diverse geographical perspectives in the making of policy and industry ambitions that steer the CE transition.

Third, this thesis also advances research on organizational Change Management for CE (OCCE) by introducing a socio-environmental assessment framework rooted in systems change. This framework helps to identify trigger points, challenges, and opportunities for transformative CE transitions at the organizational level. By implementing this framework, this study provides empirical evidence on how businesses have aligned CE practices with social and environmental sustainability goals, challenging the assumption that these goals are inherently conflicting.

Additionally, this thesis provides a methodological contribution by illustrating how transformative research (TR) enhances the social dimension of CE. First, diverse perspectives from STEM and SSH disciplines, combined with practitioners' knowledge, fostered synergies that enriched and deepened the research. The resulting co-created outputs reflected nuanced recommendations for businesses and policymakers shaped by various stakeholders, including vulnerable workers. Second, co-creating future visions of the sector with stakeholders chosen with a principle of diversity (geography, expertise, type of worker) and inclusion (ensuring most vulnerable workers are represented) yielded significant benefits. Additionally, working with transdisciplinary local voluntary steering boards grounded the research in local contexts. This approach addressed specific concerns, building trust, and facilitating outreach to companies.

Finally, working across social and environmental sciences and transdisciplinary approaches, made evident that our educational system must rethink how the CE is taught, ensuring a more inclusive and just approach is integrated. This requires rebalancing CE curricula to include its social dimensions and providing opportunities to enact this change. This thesis contributes to this process by the integration of the **SIAF-CE²** methodology into sustainability master programs of a Spanish and a Dutch university.

In line with the transformative research approach, this thesis not only aims to advance academic knowledge but also at providing practical tools for businesses and an actionable framework for policymakers to walk the inclusive circular talk.

8.3.2 Societal impact

This research engaged with a variety of stakeholders from the TAVC including businesses, workers, and policymakers. First, the research developed tools and methodologies to help *businesses* address imbalances between social and environmental priorities in implementing CE practices. For example, the SIAF-CE² guided companies in assessing social impacts, emphasizing job quality, well-being, and inclusion. The practical significance of the research is recognized across stakeholders. For instance, the SIAF-CE² tool has gained interest from the World Business Council for Sustainable Development, (a network of more than 225 large international companies) that plans to use it as the basis for a forthcoming framework to assess social impacts in circularity across sectors.

Additionally, the *futureing* and STE processes fostered synergies and internal cross-department collaborations. In some STE experiments, CSR and HR departments—typically siloed—worked together to enhance worker well-being programs. In other cases, employees formed well-being groups or contributed ideas to such initiatives. These collaborations led to better practices, including circular reskilling programs, improved material flow data collection, and worker committee formation, as detailed in Chapter 5.

Externally, businesses also built partnerships, for instance, through a community of practice with over 90 research participants from the Netherlands, Spain, and India. For over two and a half years, this community facilitated knowledge-sharing through deep dives, lessons-learned sessions, and “circular speed dating”, fostering mutual learning and inclusive CE practices.

Second, some of the piloted recommendations resulting from this research contributed to improving *workers’* well-being. For example, recommendations to formalize written contracts in India were implemented in three of the five businesses in India. Additionally, the creation of workers committees in one of the two companies in Spain was also followed through. The implementation of these recommendations is significant because lack of workers protection and lack of voice and collective bargaining have been identified as critical challenges in the sector (Ascoly, 2009; Musiolek et al., 2020; Russell, 2020). Although direct impact can only be attributed to the ten companies that participated in the STEs, they testify to the possibility of scaling the process,

potentially benefiting many more workers. These outcomes show that the use of STE has a great chance to improve workplace conditions and amplify workers' voices across different geographical contexts.

Furthermore, for policy making, this thesis developed a just transition (JT) policy framework, co-created with social and environmental scientists, to align CE practices with social justice principles. The aim of the framework was to provide policy recommendations to strengthen a CE just transition in the sector via the analysis of the EU Green Deal's Circular Textile Strategy. The key policy insights were published as a book and presented to the EU Research Directorate. The JT policy framework proved also instrumental in analyzing local cases from which three policy briefs on a just and transformative CE transition in the Netherlands, Spain, and India were created (see annexes 7.4, 7.5 and 7.6).

The policy briefs that summarize the evidence of this thesis, were presented from September to December 2024 to key policymakers, including the Netherlands' Ministry of Infrastructure and Water Management, India's Ministry of Textiles, and Madrid public officials overseeing textile collection. While it is too early to measure potential impacts on policies, the interest from these agencies underscores the frameworks and policy briefs relevance. Finally, although focused on textiles, the policy recommendations included in this thesis—such as extending just transition mechanisms beyond Europe and implementing a Just EPR—align with findings in other sectors, including plastics and tyres, as highlighted by research from (Campbell-Johnston et al., 2020; Thapa, 2023). indicating that a justice lens across sectors is pivotal for the CE transition as a whole.

8.4 Reflections on methodological approaches and limitations

During the research for this thesis several challenges were encountered related to (i) the research approach, (ii) amplifying workers' voices and mitigating response bias, (iii) sample size and generalizability.

Research approach

Implementing transformative research with a diverse base of stakeholders of different cultures, countries, field of expertise, practical approaches and epistemological views was sometimes difficult and particularly demanding, which has also been identified by literature (Abma et al., 2017). It required a considerable amount of time, energy, reflexivity, patience, and understanding in dealing with the multiple tensions. These tensions arose (to a varying degree) in every co-creation phase, including the steering committee, core

Ashoka fellows partner group, future vision exercises, experimentation, business recommendations, and STEM-SSH policy analysis. While this did not compromise research quality or results, it often slowed progress and occasionally led to stakeholder disengagement.

Workers voices

Amplifying the voices of vulnerable workers was a priority of this thesis but proved difficult, particularly due to COVID-19 disruptions that limited direct engagement. Companies acted as the primary entry point, introducing an inherent bias. For instance, surveys were conducted on their premises during working hours, potentially pressuring workers to provide more favorable responses. Additionally, worker responses were shaped by their perception, and variations in education, geography, and language, increasing the risk of question misinterpretation. As some of these potential biases were considered during the planning phase, efforts were made to reduce this risk—by conducting surveys in private rooms without company supervision, by employing multilingual canvassers and survey tools that used audio and visual supports to reduce potential misunderstanding. However, the workers' biases could not be entirely eliminated.

Generalizability of findings

The study's geographic distribution, sample size, and limited experimentation period constrain the generalization of the findings. While it provides in-depth insights across circular strategies, companies, and countries, it captures only a partial view of industry-wide trends. Statistical correlations were not applied due to the small worker survey sample, meaning the results cannot be considered broadly representative. However, triangulating findings with existing literature and expert committee input helped mitigate this limitation and enhance validity. Additionally, the short-term nature of the experimentation made it difficult to observe significant long-term social changes. The study could only identify emerging trends and potential directions rather than definitive outcomes. Findings were therefore interpreted with caution regarding the long-term implications.

8.5 Way forward

8.5.1 Future research

This thesis aimed to inspire further exploration of inclusive circular practices and future studies on social justice in CE transitions across industries and geographies. Based on our results and the identified limitations of the research presented in this thesis, future research could be expanded into four

main areas: data generalization, longitudinal analysis, broader global south participation, and environmental scope.

While this thesis provides depth on singular cases, breadth should be emphasized in future research to improve generalization of the findings. This could be done by either i) expanding the number of companies analyzed, and the types, for instance including also large corporations ii) extending the value chain coverage to include extraction and user phases, iii) increasing the amount of worker surveys and including more marginalized groups, such as textile waste collectors, iv) expanding STEs beyond intra-company efforts to intercompany collaborations along the value chain (e.g., external suppliers and consumers), and by including companies that are not front-runners of circularity, but instead adapted to the linear model. This will help to further analyze practical barrier implementations from switching from a linear system to a transformative circular one.

Longitudinal research is needed to capture a long-term impact. Conducting long-term experiments (STEs) would help capture changes over time, identify which measures become embedded in organizational practices (Edmondson et al., 2001; Benschop & Verloo, 2010) and document sustained outcomes.

Geographical diversity in knowledge co-creation remains underdeveloped in CE research, which is still largely European and Western-centric (Hobson & Lynch, 2016; Lacovidou et al., 2020; Pauliuk, 2018; Ruiz-Real et al., 2018; Swyngedouw, n.d.). While this study includes perspectives from one Global South country, further research would deepen this scope. Collaborating with universities in textile production and end-of-life- textile waste-intensive regions—such as Chile, Ghana, Turkey, Bangladesh and Pakistan —could provide crucial insights, as these regions bear the heaviest social and environmental burdens of textile manufacturing and textile waste handling.

Finally, while this research focused on the social dimension of CE, and integrated along the environmental dimension through material flow, future studies could broaden the environmental analysis. This could include comprehensive water, energy, flow assessments (in addition to the material one) or conducting cradle-to-grave Life Cycle Assessments (LCAs) across different circular strategies in diverse geographic contexts.

8.5.2 Practical suggestions for implementation.

This thesis advocates for a systematic, yet flexible, approach that integrates social impact and justice considerations using system and *futuring* methods, to increase the uptake of social considerations in CE business implementation

and policymaking. This approach is summarized by the acronym **H.A.P.P.I.** **H**olistic (rebalance socio-environmental considerations), **A**ssessment, (of social impacts), reviewing of **P**rocesses in place that enable or constrain change, **P**rioritization of vulnerable workers, **I**mplementation of targeted change (see Figure 8.1).

The first step is to ensure a **Holistic** Perspective – which consists of rebalancing social and environmental considerations in CE. This step calls for co-creation of alternative collective future visions through transformative approaches. (e.g. through the TCF). This requires engaging a diverse range of stakeholders, including workers, especially the most direct and indirect vulnerable workers in the value chain.

Second, **Assessment** of Social Impact – This step consists of making social impacts visible and ensuring accountability. Applying a just transition-gender lens within a framework such as SIAF-CE⁹ helps identify which workers are affected, how, and where the most vulnerable are in the CE transition (recognitive justice). It also clarifies which vulnerabilities need to be addressed and restored (i.e. distributional and restorative justice).

Third, Reviewing Existing **Processes** – This step deals with understanding which mechanisms and processes sustain worker vulnerabilities. It also deals with identifying those mechanisms needed for change (i.e. procedural justice) to ensure direct worker participation not only in problem assessment but also in solution design.

Fourth, **Prioritizing** Vulnerable Workers – Action should focus on those most at risk workers-to make changes where it matters the most and not where it is easy to make changes-. By using an intersectional approach (Crenshaw, 1991) that considers gender, race, migration status, and age, the most vulnerable workers in the implementation of CS can be identified.

Finally, **implementing** Targeted Change – In this step, implementing short-term experiments to enable long-term transformative visions should be privileged. As transformative change is ongoing, continuous monitoring can ensure minimizing trade-offs and/or potential exclusion of stakeholders. In this study, STEs (Sustainability Transition Experiments) were used to enact change, as experiments have proven to be a way to minimize resistance and build trust over time (Bocken et al., 2021; Weissbrod & Bocken, 2017).

By iterating these processes, we believe just, and circular practices could be normalized within corporate structures, following Benschop & Verloo, (2010)

where gender equality can change, but needs long-term sustained efforts. STEs are inherently holistic, balancing social and environmental aspects.

They are short-term and concrete while aligned with long-term collective visions, and they foster collaboration with academic institutions, contributing to the inclusive CE knowledge exchange. Ultimately, this research envisions a more just and circular “normal” through iterative, systemic, and inclusive change.

To enable usability of tools and methods presented and help businesses and policymakers on the transition, Figure 8.1 presents a Step-by-step approach and indicates relevant chapters and annexes that can be used for each step.

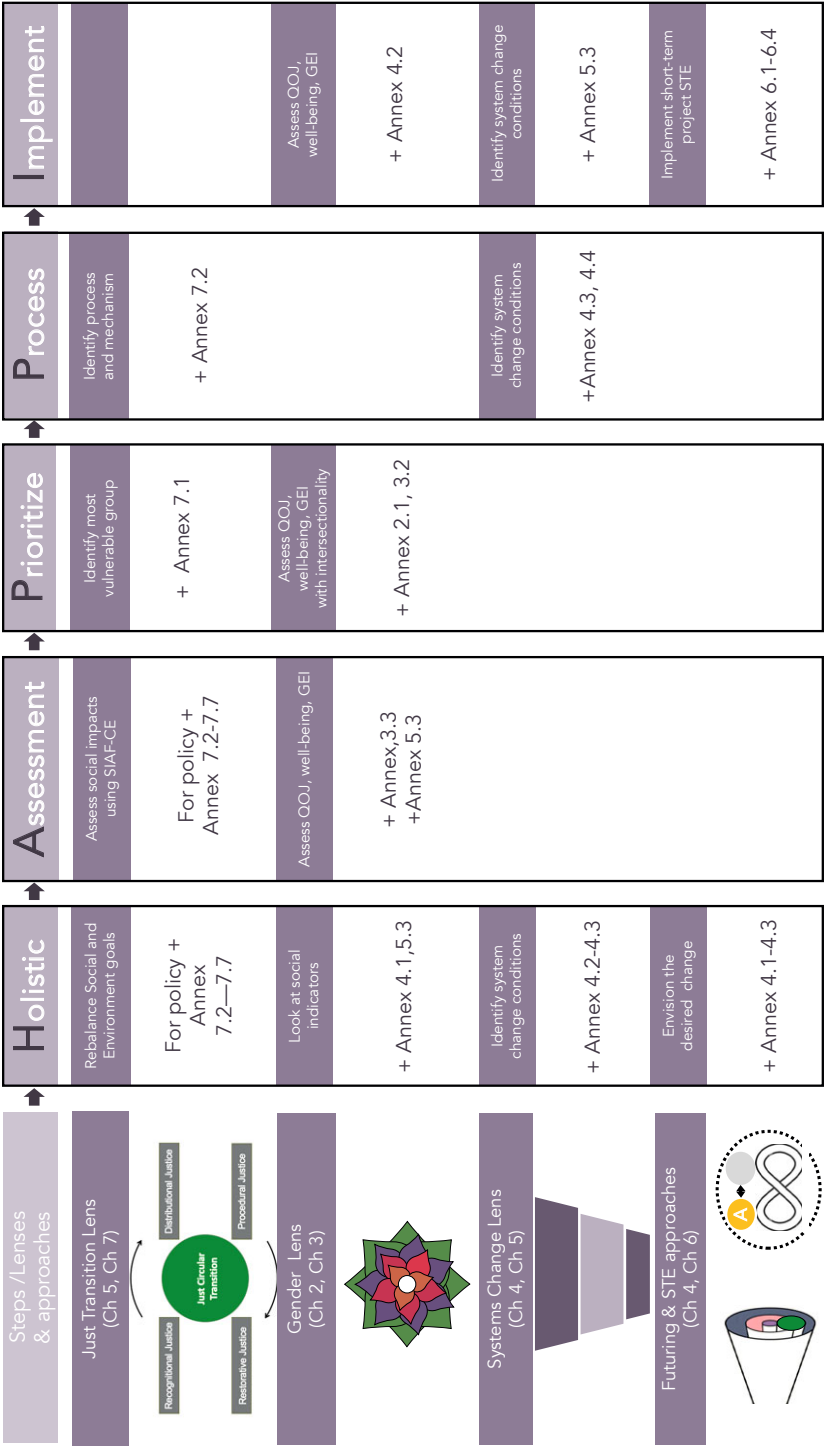


Figure 8.1. Step-by-step H.A.P.P.I. approach for businesses and policymakers to use methodologies and tools from this thesis.

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***"We cannot all succeed when half of Us
are held back."***

Malala Yousafzai

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Annex 7.6 Policy brief India: Policy recommendations for an inclusive & just Circular Economy transition in the textile and apparel value chain



Annex 6.1 Roadmap with recommendation per company

The NETHERLANDS	
Company Code	H
Green	Material Flow recommendation
Purple	Social Impact recommendation
Recommendation from baseline analysis	Improve collection system to reduce water waste by campaigning with the municipality (Utrecht)
Recommendation from baseline analysis	Improve conditions for reducing contamination in textiles. Research feasibility for garment care - we'll let this row go
Recommendation from baseline analysis	Reduce what is sent to bulk by having a repair station for getting buttons and zippers fixed (NOTE: PROJECT ON THE WAY)
Recommendation from baseline analysis	Reduce what is sent to bulk by The same station can make more creative fixed-pairs with eco-designers and sell as specific up-cycled items in-store (in partnership with eco-designer)
Recommendation from baseline analysis	Quality of Jobs: Provide training for repairing & sorting for preparing
Recommendation from baseline analysis	Quality of Jobs: Ask workers what additional skills they want to learn, and provide the training; showcasing commitment towards worker's future. NOTE: will be dealt with HR
Recommendation from baseline analysis	Quality of Jobs: Improve ergonomics of work; have a space for relaxation and/or for stretching, or provide training on exercises to do to relieve pain. (explore in the long-term); with financial part—what can be done in 6 month
Recommendation from baseline analysis	Wellbeing: Develop greater socially involved programs to promote employees engagement e.g. fair of circularity
Recommendation from baseline analysis	Wellbeing: Provide money-saving options at work or provide money management courses with external parties
Recommendation from baseline analysis	Gender equality and inclusion: Giving workers training on their rights, the role of unions, and how to create more clear channels of communication with the management
Recommendation from baseline analysis	Gender equality and inclusion: Supporting workers to establish a worker committee.
Recommendation from baseline analysis	Gender equality and inclusion: Gender equality policy should be known and accessible to workers through training regarding what GEI means (with the support of external NGOs)

I	
Company Code	
Green	Material flow recommendation
Purple	Social Impact recommendation
Recommendation baseline analysis	Ask brands (x) to have an extra piece of fabric stitched in every piece with a button
Recommendation from baseline analysis	Make sure that customers know this is for repairing purposes in caring instructions
Recommendation from baseline analysis	With EPR in place and take-back programs, get Patagonia to collect and send to URC old jackets from which material can be saved
Recommendation from baseline analysis	3.Circular re-skilling: Put a program to facilitate de-manufacturing for reuse as part of training with newcomers leading to creation of a scrap-textile waste inventory for repairing (NOTE: academy, production inventory management)
Recommendation from baseline analysis	4.Train clients and Educate Customers about repairing: Make a standard form for repairs (and share it with clients, including a policy that states that repair might look different, (as is the nature of repair-upcycle); NOTE: already working information on that, united repair platform)
Recommendation from baseline analysis	5.Collaboration with wider Network and Stakeholders Partner with sympathy or other collector company (in Amsterdam) to save broken outdoor
Recommendation from baseline analysis	5.Collaboration with wider Network and Stakeholders: Collect textile, make waste inventory waste and sell/donate it for repurposing

Recommendation from baseline analysis	Quality of jobs: Equalize base pay for the same job position at the same salary disregarding the gender of the worker, and aim at an aligned salary to the Dutch living wage.
Recommendation from baseline analysis	Quality go jobs: Include some monetary incentives linked to performance and provide some additional non-monetary benefits
Recommendation from baseline analysis	Quality of jobs: Make the salary ranges table visible for all, put salary on the job description and main points of CAO in their language, and share Wellbeing: Provide financial literacy training and look into external option saving options
Recommendation from baseline analysis	Wellbeing: Connect with local municipalities or (through volunteers) organisations that provide community programs and try to connect those
Recommendation from baseline analysis	Gender equality and Inclusion: Improve voice and collective bargaining of employees
Recommendation from baseline analysis	Gender equality and Inclusion: Provide external training about equal opportunity and workers rights and rights and responsibilities in the
Recommendation from baseline analysis	Have a well-being newsletter with information relevant to support their well-being & working rights
Company Code	
Green	J
Purple	Material Flow recommendation
(Please select appropriate targets and deadlines for achieving them)	
Recommendation baseline analysis	Social Impact recommendation
Recommendation from baseline analysis	Improve collection system by campaigning with the municipality NOTE: Sympany will connect us with 2 municipalities (Katwijk and other to present this possibility of piloting)
Recommendation from baseline analysis	Establish creative ways to improve channels of communication and performance meetings where the worker's job can be appreciated and where his/her feedback is taken into consideration
Recommendation from baseline analysis	Develop a personal training roadmap with workers where opportunities to grow are more visible
Recommendation from baseline analysis	Engaging with workers to recognize their needs regarding feeling respected and fostering more cohesion
Recommendation from baseline analysis	Providing workers training on their rights, the role of unions, Violence and harassment and how to create clear communication channels with the

INDIA	
Company code	A
Green : recommendation on material flow	
Purple : recommendation on social impact	
Recommendation : baseline analysis:	Data Collection
(Please select appropriate targets and deadlines for achieving them)	Develop more accurate understanding of where wastes occur within Usha Yarns as well as how partner recycling operations handle waste outside of the Usha system.
Recommendation from baseline analysis:	Providing contracts with benefits to women sorters will improve job security. NOTE: sorters work with contractor
Recommendation from baseline analysis:	Revise salary for sorters to enable them to cover social security. NOTE: this revision was done between baseline data collection and presentation
Recommendation from baseline analysis:	Provide additional monetary and non-monetary benefits based on sorting performance
Recommendation from baseline analysis:	Provide training about violence and harassment, SHRP and put procedure in place specially for sorters workers
Recommendation from baseline analysis:	Ensure equal starting pay for all workers at the same level of experience and requirements
Company Code	
Green	B
Purple	Material Flow recommendation
Recommendation : baseline analysis	Social Impact recommendation
Recommendation from baseline analysis	Sorting the discarded HRP cut-offs for material waste library
Recommendation from baseline analysis	Re-design upcycled discards and create unique 'Zero waste collection' product families of accessories
Recommendation from baseline analysis	Improve data collection
Recommendation from baseline analysis	To build waste inventory network
Recommendation from baseline analysis	Strive to pay the same wage for the same job, regardless of their gender
Recommendation from baseline analysis	Collaborate with the local NGO to provide financial literacy courses
Recommendation from baseline analysis	Provide ongoing training programs in new technologies and machinery, along with soft skills training, such as communication and repair
Recommendation from baseline analysis	In terms of health and safety make working space more tidy, cables should be protected (and far from fabric to avoid fire)
Recommendation from baseline analysis	Improve employee access to company policies through training with pictorial and video representation to facilitate understanding.
Recommendation from baseline analysis	Connect with a local INGO or union to provide training on gender equality, violence and harassment
Company Code	
Green	C
Purple	Material Impact recommendation
Recommendation : baseline analysis	Social Impact recommendation
(Please select appropriate targets and deadlines for achieving them)	Reuse/ remanufacture current output of non-usable textile currently going to donations and recycling facilities and try a Zero-waste collection
Recommendation from baseline analysis	Improving salary, providing contracts and additional benefits to temporary workers who are the most vulnerable
Recommendation from baseline analysis	Equalize your base salary and create a table – scale available for any worker to see
Company Code	
Green	D
Purple	Material Flow Recommendation
Recommendation : Baseline Analysis	Social Impact Recommendation
(Please select appropriate targets and deadlines for achieving them)	Washing and Sorting Techniques: Developing higher quality washing infrastructure and process for workers with limited access
Recommendation from baseline analysis	Cutting: Collect plastic cutting waste and maintain a color-coded waste scrap inventory to create a 'zero plastic waste collection' of accessories
Recommendation from baseline analysis	Building a relationship with local municipality to support workers picking and sorting plastics
Recommendation from baseline analysis	Capitalize on Plastiskul, repurpose and rechanneled all plastics collected to higher circularity strategies with support from local municipality; intern
Recommendation from baseline analysis	Better knowledge of waste streams to help identify places for intervention, such as developing a system for Waste and Scrap inventory
Recommendation from baseline analysis	Quality of Jobs: Revise wages such that it aligns with the minimum salary going to a living wage and Ensure equal starting pay for all workers at the
Recommendation from baseline analysis	Start providing basic written contracts to workers have them cover social security and provident funds.
Recommendation from baseline analysis	Provide monetary and non-monetary benefits

Company Code	
Green : recommendation material flow	
Purple : recommendation on social impact	
Recommendation baseline analysis:	Reduce the output of dead-stock inventory by focusing more on remanufacturing of the material. Incorporating Eco-design principles. (such as Redesign, Remanufacture and Repurpose transform deadstock into 1. complementary upcycled dresses, 2. pouches or computer pouches or other products under a unique "Zero Waste collection."
Recommendation from baseline analysis:	Providing contracts to those workers without one
Recommendation from baseline analysis:	Provide access to training opportunities for workers related to circularity, Violence and harassment, voice and collective bargain and others related to personal growth)

Spain	F	
Company Code		
Recomendación de flujo de material		
Recomendación de impacto social		Mejorar el proceso de limpieza (limpieza más profunda) asociarse con la organización para hacerlo (tal vez una empresa de reinserción y de esa manera aumentar el material trabajable. NOTA: Ya se está haciendo
Recomendación del análisis de referencia		Corte y costura : Reducir el cubierto de raspi y bolsa de compras y crear pequeños productos a partir de ellos bajo una línea limitada de
Recomendación del análisis de referencia		Colaboración con la red: Crear una biblioteca de inventario de desecho para enviar a otras organizaciones para su reutilización (para mover el inventario muerto) y Mejorar la recopilación de datos de residuos e inventarios para poder encontrar soluciones más óptimas al inventario muerto
Recomendación del análisis de referencia		Calidad del trabajo : Desarrollar políticas internas para reducir la brecha entre los ingresos más bajos y más altos. (NOTA ya se está trabajando)
Recomendación del análisis de referencia		Calidad del trabajo : Mejorar el espacio físico (aislamiento-energético con reciclaje textil mejor sistema de calefacción/luz. Y generar un espacio
Recomendación del análisis de referencia		Brindar capacitación continua actualizada y de buena calidad a los trabajadores . * Este podría ser un tema a tratar con el comité de bienestar
Recomendación del análisis de referencia		Crear un comité de bienestar que permita ideas interesantes de los trabajadores.
Recomendación del análisis de referencia		Diseñar políticas internas enfocadas en el bienestar físico y emocional de los trabajadores. * Este podría ser un tema a tratar con el comité de
Recomendación del análisis de referencia		Buscar acuerdos especiales (banco de horas, semanas reducidas con los mismos esquemas salariales que permitan una mayor flexibilidad en el horario de trabajo para que los trabajadores disfruten de más tiempo libre en familia. * Este podría ser un tema a tratar con el comité de bienestar
Recomendación del análisis de referencia		Hacer que las tablas de escalas salariales estén abiertas a todos los empleados. (NOTA: ya existe y se puede ver, pero podría revisarse con el
Recomendación del análisis de referencia		Brindar capacitación sobre igualdad de género, violencia y acoso y SHRR, con ONG u organizaciones comunitarias. Actualizar o socializar la
Recomendación del análisis de referencia		Redefinir las relaciones empleador-empleado para que sean más flexibles, abiertas y confiables, lo que permite a los trabajadores tener una mayor
Recomendación del análisis de referencia		Generar un buzón de sugerencias sobre otros tipos de formación que a los empleados les gustaría recibir para su crecimiento personal. * Este
Company Code	G	
Recomendación de flujo de material		
Recomendación de impacto social		Priorizar jerarquía circular y reemplazar valorización energética. NOTA: Ya está en proceso un estudio piloto de venta local A+B) acompañada de un proceso de sensibilización/ Prueba
Recomendación del análisis de referencia		Establecer diferentes cadenas de valor en las que se pueda colocar la ropa deteriorada. Proyecto en Curso con sensibilización (reparación)
Recomendación del análisis de referencia		Biblioteca de desechos, para colaborar con otras empresas
Recomendación del análisis de referencia		Calidad de trabajo: Crear bandas salariales para incentivar a los trabajadores. (Nota este proyecto ya se está llevando a cabo a través de equilibrio
Recomendación del análisis de referencia		Crear un comité de bienestar para ayudar a identificar y promover actividades para aumentar el nivel de bienestar de todos los empleados (no a
Recomendación del análisis de referencia		Trabaja con esquemas motivacionales, mejor ordenando más dinero
Recomendación del análisis de referencia		Mejorar la ergonomía de los puestos de trabajo. Más descansos y/o promover actividades-espacios relajantes en el trabajo
Recomendación del análisis de referencia		Brindar capacitación (ONG externa sobre educación financiera y esquemas de ahorro) y sobre e temas de violencia y acoso.
Recomendación del análisis de referencia		Tener una política y el acoso en su lugar

Annex 6.2 Format roadmap

Name of Company							
Contact Person							
Green	Material flow recommendation						
Purple	Social Impact recommendation						
<i>(please select appropriate targets, task and deadlines for achieving recommendations)</i>							
Recommendation baseline analysis		Recommendation 1					
Targets for this recommendation		Due date	Follow up meeting 1	Follow up meeting 2	Follow up meeting 3	Follow up meeting 4	Follow up meeting 5 Follow up meeting 6
What support will you need form UU to achieve this target							
Notes							
Recommendation from baseline analysis		Recommendation 1					
Targets for this recommendation		Due date	Follow up meeting 1	Follow up meeting 2	Follow up meeting 3	Follow up meeting 4	Follow up meeting 5 Follow up meeting 6

What support will you need form UU to achieve this target

Notes



Annex 6.3 Piloting interview guide for companies.

1. How far are you to reaching goal
 2. What problems have you encountered
 - technocratic
 - financial
 - soft system (lack of cooperation,
 - Culture and infrastructure)
 - time management
 - other: explain
 3. Are these issues still issues
 4. What have you done to overcome each
 5. What support will you need from UU or other actors to achieve this target
 6. Anything else you want to share?
-

Thank you very much.

Annex 6.4 Exit interview question for companies.

During these six months period, we have selected social and environmental measures along with you to improve the social impact and the circularity aspect of your work. Now that one month has gone by would like to reflect with you about the process and what you think has changed. We believe that for actual change to happen six conditions should be present. I will ask about this.

1. Could you validate you follow this development in your company?
2. Did any policy, internal rules or regulation or process change? (Think both the social and environmental side; (for example new manual for employee improved, or a new internal law in GE, or new training or improve well-being program)
3. What barriers did you face in making this happen?
4. What do you think would have helped to steer more positive change, and what did help?
5. What would you have done differently and why?
6. What about relational level, where there any new roles or positions created, modified or disappear
7. What barriers you faced in making this happen

8. what do you think would have helped to steer more positive change, and what helped (what levers) it could be internal or external intervention?
9. What about the transformational level Did you identify new narrative, new set of values, shared beliefs or behaviors in you?
10. How about in others (in who and how)
11. Could you give a concrete example?
12. What barriers you faced in making this happen
13. What do you think would have helped to steer more positive change, and what helped (what levers) it could be internal or external intervention?
14. What sort of impact do you think this kind of intervention (piloting with university) has (or can have for you/ the company in the short-medium or long term? Can you give concrete examples?
15. Anything else you want to share? Thank you very much.

Annex 7.1 List of policy documents

#	Policy name	Status at the time of analysis
1	COM (2022) 141 final, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Strategy for Sustainable and Circular Textiles	Final text
2	COM (2022) 142 final, Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a framework for setting eco-design requirements for sustainable products and repealing Directive 2009/125/EC	Proposal
3	COM (2022) 71 final, Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Corporate Sustainability Due Diligence and amending Directive (EU) 2019/1937	Proposal
4	COM (2022) 143 final, Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directives 2005/29/EC and 2011/83/EU as regards empowering consumers for the green transition through better protection against unfair practices and better information	Proposal
5	COM/2023/645 final, Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on preventing plastic pellet losses to reduce microplastic pollution	Proposal
6	COM (2023) 420 final, Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2008/98/EC on waste	Proposal
7	COM/2021/709 final, Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on shipments of waste and amending Regulations (EU) No 1257/2013 and (EU) No 2020/1056	Proposal
8	COM/2021/573 final, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS New European Bauhaus Beautiful, Sustainable, Together	Final text
9	PE/20/2020/INIT, Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (Text with EEA relevance)	Final text
10	COM/2020/274 final, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS European Skills Agenda for sustainable competitiveness, social fairness and resilience	Final text
11	PE/5/2021/REV/1, Regulation (EU) 2021/1056 of the European Parliament and of the Council of 24 June 2021 establishing the Just Transition Fund	Final text

Annex 7.2 Interdisciplinary analytical framework on the socio-ecological justice and sustainability implications of a circularity transition

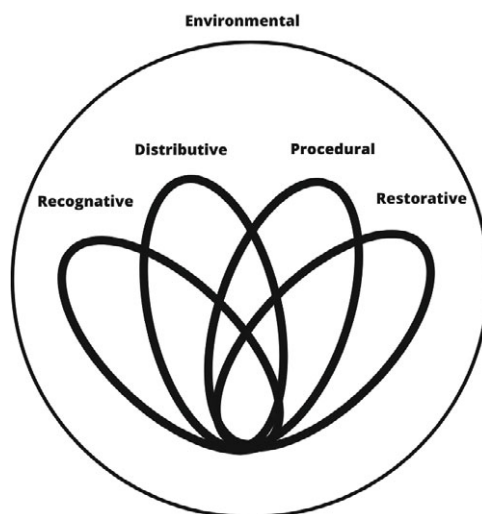


Figure 7.1 interdisciplinary analytical framework combining five interrelated and interconnected dimensions of socio-environmental justice (modified from Härri and Levänen, unpublished).

1) Environmental Dimension:

1. Does the policy document explicitly recognize that consumption and production have planetary limits?
2. What limits are recognized (9 planetary boundaries as reference: Climate Change, Biodiversity Loss, Land Use Change, Freshwater Use, Ocean Acidification, Nitrogen and Phosphorus Cycles, Ozone Depletion, Chemical Pollution, Air Pollution)?
3. Do Consumption and production targets and ambitions fit into planetary limits?
4. Does the document recognize that the EU currently exceeds planetary limits?
5. Does it address and prevent greenwashing?
6. Does it promote the reduction of advertising?
7. Does it promote Greater transparency, and how?
8. Does it promote circular strategies following the 10Rs value retention hierarchy of Reike et al. (2018): R0: Refuse, R1: Reduce, R2: Reuse, R3: Repair, R4: Repurpose, R5: Refurbish R6: Remanufacture, R7: Recycle, R8: Recover (energy), R9: Remine

9. Does it prioritize the R (value retention) hierarchy (placing higher Rs as more important)?

2) Recognitive dimension:

Whose vulnerability is recognized:

1. Formal workers (in Global North and Global South)
2. Informal workers (in Global North and Global South)
3. Farmers (in Global North and Global South)
4. Women and gender relations
5. People of color, indigenous people and ethnic minorities (in Global North and Global South)
6. Low-income/class households (in Global North and Global South)
7. Suppliers (manufacturers in the Global South)
8. NGO's and CSOS (in GS and GN)
9. Communities close by
10. More-than-human life (animals, plants, insects, fungi, Mother Earth as a living spiritual entity, ecosystems, mountains and rivers, etc.)
11. Businesses like SMEs and social enterprises (in the EU)
12. Countries or territories in the Global South

3) Distributive dimension (WHAT):

1. Does it affect the economic distribution (fair distribution) of wealth and income (in Member States, EU and beyond the EU)?
2. Are quality jobs promoted and benefiting which type of workers/people (in Member States, EU and beyond the EU)? (Quality of job is understood as wages, work security, and working conditions.)
3. Does the policy seek to improve the well-being of people (understood as access and enjoyment of minimum living standards and considering health, education, and physical assets (household))?
4. Does it account for the number of jobs created and lost, and who might benefit/be affected by job gains/losses (in Member States, EU and beyond the EU)?
5. Does it foster collective vs private owners of means of production/assets (Technology, fixed capital natural assets, land tools, machinery, etc.) (in Member States, the EU and beyond the EU)?
6. Are economic and social costs shared fairly and proportionally (in Member States, EU and beyond the EU)?
7. Are economic and social benefits shared fairly and proportionally (in Member States, EU and beyond the EU)?
8. Are potential environmental impacts and their potential costs and effect on people shared fairly and proportionally (like the placing of factories,

recycling centers, solar farms etc.) (in Member States, EU and beyond the EU)?

9. Does it promote enabled sharing of technologies and knowledge (open source/ open access technologies) (in Member States, EU and beyond the EU)?

4) Procedural dimension (HOW):

1. How are different voices and actors democratically included and given decision-making power throughout the process (including voices of the GS and marginalized views)?
2. What kind of education training awareness, media coverage, and knowledge on the topic is fostered to encourage greater understanding and participation of all voices (especially those who are often excluded)?
3. How transparent and open is the governance process?
4. Are there any self-correcting mechanisms and democratic policy revisions and reviews based on their outcomes and socio-ecological impacts?

5) Restorative dimension:

1. Are financial, technical, and technological assistance and support from the Global North to the Global South proposed and carried out in a decolonized way?
2. Are there mechanisms or policy actions to ensure legal liability as well as reparations, remediations and compensations when any corporate, state, or person causes human and environmental rights violations (for example, through international courts or other legal instruments or other forms of reparation and remediation for social or environmental harm)?
3. Is there a fair accounting and distribution of emissions or benefits (e.g. pollution quotas that account for past emissions, financial assistance that accounts for historical impacts)?
4. Does it explicitly mention and address possible socio-ecological trade-offs?

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Summary

The Textile and Apparel Value Chain (TAVC) is among the most resource-intensive sectors, generating significant waste while relying heavily on a vulnerable workforce. In recent years, businesses across this value chain have adopted Circular Economy (CE) as a strategy to mitigate sustainability challenges in the sector. However, most CE efforts remain narrowly focused on material efficiency and waste reduction, often neglecting the social dimension.

This PhD dissertation addressed the lack of social and justice considerations in the CE transition and its systemic implementation at the business level. By investigating the real-world application of CE practices across different geographical contexts—specifically in the Netherlands, Spain, and India—the research delves into i) how businesses can adopt circular practices while ensuring that social justice and equity are integral to the process. And ii) how policymakers can enable a more just circular transition in the sector.

By adopting a transformative research (TR) approach that blends gender, just transition, and systems-change lenses, this dissertation makes stakeholders' diversity and co-creation a central element of the research. It engages with academic experts, businesses, policymakers, and workers—particularly those in vulnerable positions. The TR approach ensures the inclusion of workers' perspectives in the analysis of CE practices. Additionally, a combination of qualitative and quantitative methods provides a comprehensive understanding of the socio-environmental impacts of circular strategies across different cultural and economic settings.

Key findings from the research reveal that the social dimension of CE is crucial for its success as a vehicle to achieve sustainable development. Without a deliberate focus on social impacts, CE practices risk reinforcing existing inequalities, such as poor working conditions or gender discrimination, and perpetuating unequal power dynamics. This insight challenges the prevailing view that environmental and social sustainability are separate goals, advocating for a more integrated and holistic approach that links CE's environmental, social and justice dimensions. It also provides nuanced geographical evidence on the impact of circular strategies on vulnerable workers. Findings also revealed that Transformative Circular Futures (TCFs), offer promising pathways to develop more inclusive circular policies and practices in the TAVC. TCFs enable social transformation through active co-creation by a diversity of stakeholders representing global and local realities, which align with just transition principles.

Critical contributions of this thesis include i) the development of the Social Impact Assessment Framework for Circular Economy (SIAF-CE^g). This framework provides a structured method for companies to assess and address the social implications of their circular strategies, filling a gap in existing research that has predominantly focused on the environmental aspects of CE. The SIAF-CE^g enables businesses to identify areas for improvement in social outcomes, such as enhancing worker conditions, ensuring fair wages, and promoting gender equality, within the context of CE. ii) the co-creation of the Just Transition (JT) Policy Framework that was applied to the European Green Deal Circular textiles strategy policy documents. Additionally, it served as a foundation for developing target policy briefs for the sectors in India, Spain, and the Netherlands.

Finally, on a theoretical level, this dissertation calls for the integration of the socio-environmental dimensions of CE conceptualization to minimize potential trade-offs that jeopardize CE's ambition to catalyze sustainable development in the sector. On a practical level, this dissertation advocates a systemic approach to address inclusion, diversity, and justice in CE practices. It stresses the need to establish holistic goals that rebalance the social and environmental ambitions of CE. It underscores the need to ensure recurrent assessment of the CE social gap, focusing on the most vulnerable workers. Lastly, it calls for the identification of system conditions, processes, and mechanisms that prevent or enable change and for the development of a targeted action plan to address specifically these workers. In this way, this dissertation aims to contribute to walking the talk towards a just and transformative Circular textile and apparel value chain.

Samenvatting

De textiel- en kleding waardeketen (TAVC) is een van de sectoren die de meeste natuurlijke hulpbronnen gebruikt, die aanzienlijke hoeveelheden afval genereert en tegelijkertijd sterk afhankelijk is van kwetsbare arbeidskrachten. De afgelopen jaren hebben bedrijven in deze waardeketen de circulaire economie (CE) omarmd als een strategie om de duurzaamheidsuitdagingen van de sector op te pakken. De meeste CE-inspanningen blijven echter uitsluitend gericht op materiaalefficiëntie en afvalvermindering, waarbij de sociale dimensie vaak wordt verwaarloosd. Dit proefschrift richt zich op het gebrek aan sociale, en rechtvaardigheidsoverwegingen bij de CE-transitie en de systemische implementatie ervan op bedrijfsniveau. Door de praktijktoepassing van CE-praktijken in verschillende geografische contexten te onderzoeken – met name in Nederland, Spanje en India – onderzoekt de studie i) hoe bedrijven circulaire praktijken kunnen omarmen en er tegelijkertijd voor kunnen zorgen dat sociale rechtvaardigheid en gelijkheid een integraal onderdeel van het proces zijn. En ii) hoe beleidsmakers een rechtvaardigere circulaire transitie in de sector mogelijk kunnen maken.

Door een transformatieve onderzoeksbenadering (TR) te hanteren die gender, rechtvaardige transitie en systeemveranderingen combineert, maakt dit proefschrift stakeholder diversiteit en co-creatie tot een centraal element van het onderzoek. Het werkt samen met academische experts, bedrijven, beleidsmakers en werknemers, vooral degenen in kwetsbare posities. De TR-aanpak zorgt ervoor dat werknemersperspectieven worden meegenomen in de analyse van CE-praktijken. Bovendien biedt een combinatie van kwalitatieve en kwantitatieve methoden een uitgebreid inzicht in de sociaal-ecologische gevolgen van circulaire strategieën in verschillende culturele en economische omgevingen.

De belangrijkste bevindingen uit het onderzoek laten zien dat de sociale dimensie van CE cruciaal is om met succes duurzame ontwikkeling te bereiken. Zonder een doelbewuste focus op sociale impact lopen CE-praktijken het risico bestaande ongelijkheden te versterken, zoals slechte arbeidsomstandigheden of genderdiscriminatie, en de ongelijke machtsdynamiek in stand te houden. Dit inzicht bestrijdt de heersende opvatting dat ecologische en sociale duurzaamheid afzonderlijke doelen zijn, en pleit voor een meer geïntegreerde en holistische benadering die de ecologische, sociale en rechtvaardigheidsdimensies van CE met elkaar verbindt. Het biedt ook genuanceerd geografisch bewijs over de impact van circulaire strategieën op kwetsbare werknemers. Uit bevindingen bleek ook dat Transformative Circular Futures (TCFs), een veelbelovend perspectief bieden naar de ontwikkeling van

inclusiever beleid en werkwijzen in de TAVC. TCFs maken sociale transformatie mogelijk door actieve co-creatie door een diverse groep stakeholders die zowel wereldwijde als lokale werkelijkheden vertegenwoordigen, hetgeen aansluit bij de principes van rechtvaardige transitie.

Belangrijke bijdragen aan dit proefschrift zijn onder meer i) de ontwikkeling van het Social Impact Assessment Framework for Circular Economy (SIAF-CE⁹). Dit raamwerk biedt bedrijven een gestructureerde methode om de sociale implicaties van hun circulaire strategieën te beoordelen en aan te pakken. Hiermee wordt een leemte opgevuld in bestaand onderzoek, dat zich voornamelijk heeft gericht op de milieuaspecten van CE. De SIAF-CE⁹ stelt bedrijven in staat mogelijkheden voor verbetering van de sociale resultaten te identificeren, zoals het verbeteren van de arbeidsomstandigheden, het garanderen van eerlijke lonen en het bevorderen van gendergelijkheid, binnen de context van CE.

ii) de co-creatie van het Just Transition Policy Framework dat werd toegepast op de beleidsdocumenten van de Europese Green Deal voor Circulaire Textiel. Bovendien diende het als basis voor het ontwikkelen van beleidsinstructies voor de sector in India, Spanje en Nederland.

Ten slotte roept dit proefschrift, op theoretisch niveau, op tot de integratie van de sociaal-ecologische dimensies van CE conceptualisatie, met als doel potentiële trade-offs, die afdoen aan de ambitie van CE om duurzaamheid in de sector te katalyseren, te minimaliseren. Op praktisch niveau pleit dit proefschrift voor een systemische benadering om inclusiviteit, diversiteit en rechtvaardigheid aan te pakken bij de implementatie van CE-bedrijven. Het benadrukt de noodzaak om holistische doelstellingen vast te stellen die de sociale en ecologische ambities van CE opnieuw in evenwicht brengen. Het onderstreept de noodzaak om te zorgen voor een periodieke beoordeling van de sociale kloof in de CE, waarbij de nadruk ligt op de meest kwetsbare werknemers. Ten slotte roept het op tot de identificatie van systeemomstandigheden, processen en mechanismen die veranderingen belemmeren of juist mogelijk kunnen maken, en tot de ontwikkeling van een op de implementatie gericht actieplan, gericht op kwetsbare werknemers. Op deze manier wil dit proefschrift bijdragen aan de dialoog over een rechtvaardige en transformatieve circulaire textielwaardeketen

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Lis Suarez-Visbal, September 5th, 2025



Published thesis chapters

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List of Publications connected to this thesis

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About the Author

Lis Suarez-Visbal is an Ashoka fellow, social innovator, and a Doctoral researcher at Utrecht University. She has more than 15 years of professional experience in supply chain sustainability in the textile and apparel sector in several countries including The Netherlands, Spain, India, Canada, The US, Thailand, Mali, and Colombia. As the founder and head of a Canadian NGO, she worked extensively with entrepreneurs, businesses, academia and governments to mobilize industry towards more sustainable practices.

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