↗ Circular Innovation. collective

Creating a circular and regenerative textile sector.

↗ Amsterdam Metropolitan Area, textile pilot

Metabolic

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Executive summary

The Metropolitan Region of Amsterdam (MRA) aims to achieve 70% circular textiles by 2030. This report provides a clear vision and a plan on how to successfully transition to a regenerative and circular textile system.

This research is provided by the Circular Innovation Collective (CIC), a squad of three impact-driven organizations: Metabolic, Impact Hub Amsterdam, and Bankers without Boundaries. It is supported by the Municipality of Amsterdam, DOEN, and Goldschmeding.

Launching the Circular Innovation Collective

The Circular Innovation Collective (CIC) is a consortium of impact-driven organizations pioneering a new approach to radically shift our economy from linear to circular. Within a specific value chain, the CIC aims to create a thriving innovation ecosystem that actively tackles gaps and barriers to achieving a circular state. By bringing together value chain expertise to identify and scale up high-impact circular initiatives and by unlocking public/private finance, the CIC will link financial investments to the sustainability goals of a particular territory.

The flagship pilot of the CIC is focused on textile value chains in the Metropolitan Region of Amsterdam. Numerous Dutch cities have impressive track records when it comes to circular economy plans, but access to finance is one of their most significant barriers to delivering on these plans. To address this bottleneck, the CIC aims to support the MRA in achieving its target of 70% circular textiles by 2030, not only to accelerate the circular transition, but to support regional recovery and employment strategies. In the upcoming two years, the Circular Textile Innovation program will involve all relevant stakeholders throughout the entire value chain - from designers, producers, and retailers to citizens.

The transition to a regenerative and circular textiles system

In this report we envision the future textile system for the MRA, curated through synthesizing expert interviews and global thought leadership. What we see is a flourishing local community of designers, makers, manufacturers, and citizens, whose activities are driving towards the following pillars of a circular and regenerative textile system:

Product-service systems for longevity and circularity - Creating systems to support the responsible and extended use of textile products, and ensuring that materials are consciously handled and recovered post-consumption.

Transformative design choices - Considering the full lifetime of the product in product creation processes to ensure that any synthetic or treated biobased materials do not cause unintended harm to local ecosystems.

Coordinated efforts for trust and transparency - Establishing comprehensive information flows along the supply chain, and holding all actors accountable for the impacts of their economic activities.

Culture of diversity and inclusivity - Nurturing the culture and mindset of inclusivity and diversity necessary to embrace new forms of collaboration across multiple actor groups along the value chain.

Through creating a Theory of Change, we began to explore and formulate how the local innovation ecosystem could nurture new opportunities, and support the transition of the sector from a network of pioneering organizations and initiatives to a cohesive and inclusive community aligned on the best approaches to execute the higher R strategies (see Figure 1) and achieve circularity targets. I**n the short term (up to 2025)**, we identified the need to collect best practices and connect the already vibrant network of organizations within the MRA. Building upon the existing momentum of awareness campaigns and citizen engagement, including creating common language around circular textiles, will be critical to create a level playing field. **In the medium term (up to 2030)**, we envisioned the flourishing of new and disruptive innovation as relationships between actors are aligned and strengthened with the framework of the higher R-strategies. To encourage considered decision making on circular practices in the short term, we included a **long term vision (beyond 2030**) of a regenerative textile system.

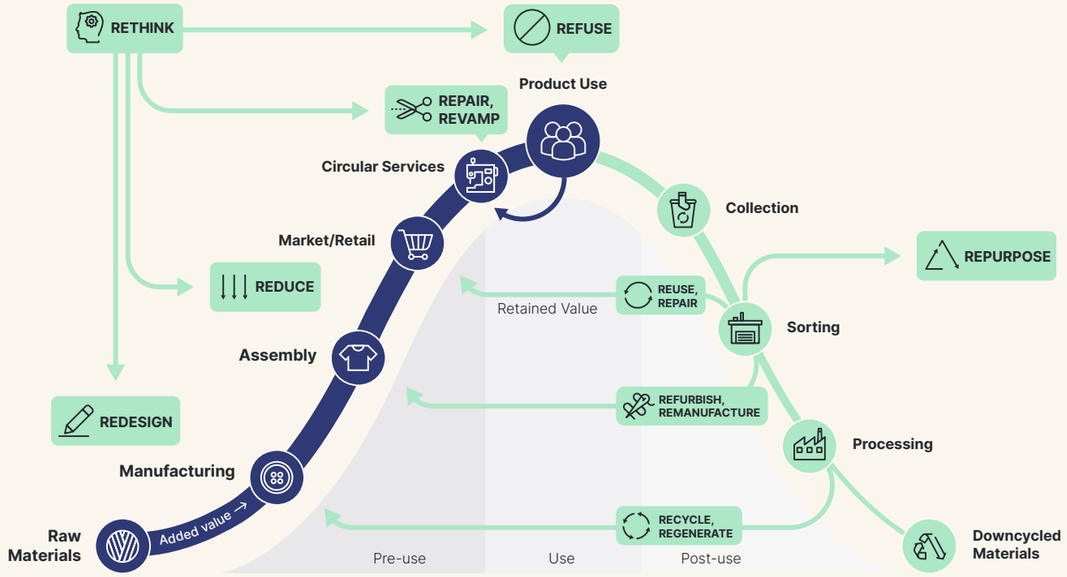


Figure 1: *R-strategies are visualized on the "Value Hill" which illustrates the full life cycle of any given product, from extraction and manufacturing through use and eventual disposal. Value is added as the product moves "uphill" along the supply chain. Circular services keep the product in use at its highest value through repairing or revamping/customizing it for continued emotional longevity. The higher R-strategy of rethink can be applied along the "uphill" stages of the value chain through the practices of redesigning, reducing and refusing. This approach is fundamental to the elaboration of new product ownership and product use models that are required for new circular business models.*

When a product starts to move "downhill", it is done as slowly as possible so that its useful resources can still be of service to others, through the refurbishment and remanufacture of products or through repurposing materials for other high value products. Once a product or component is at the end of its useful lifetime, infrastructure is available to recover materials for recycling or for transformation into non-toxic outputs for regenerating biological systems.

Creating a pathway to the textile sector of 2050, we began to crystallize out the main challenges and opportunities for new circular innovation, and identified four opportunity areas connected to our four vision pillars:

- To strengthen **product-service systems for longevity and circularity**, the affordability and accessibility of circular services need to be increased.
- To realize **transformative design choices**, we need to develop bio-based and biodegradable materials for high performance and durable products that allow for easy separation at the end of their useful lifetime.
- To achieve **coordinated efforts for trust and transparency**, we need to collectively establish frameworks and tools that accurately inform citizens on the impact of their apparel products and make them rethink their purchasing behaviors.
- To establish a **culture of inclusivity and diversity**, there is extra attention and innovation needed to create regenerative design practices and a diversity of craft.

Next steps in the program

The CIC has been scouting for higher-R innovations in line with the four opportunity areas, targeting Dutch and international startups and SMEs. In March 2023, we will launch the Circular Textile Innovation Accelerator program to support and develop scalable ventures that can catalyze the shift to circularity of the local textile sector in the MRA. Through this program, we will include local champions to support these ventures, and curate synergy and collaboration along the local value chain. Do you want to become part of this transition path and community? Please reach out to us via our website www.circularinnovationcollective.nl/.

1. CIC Program

The collective and its objectives

The Circular Innovation Collective (CIC) is a consortium of impact-driven organizations that have developed a new approach for the transformation of the Dutch economy from linear to circular. This new approach aims to create an ecosystem where the main barriers to circularity within a value chain can be removed, by bringing together the required expertise to scale up high-impact circular businesses (high on the R-ladder) and by unlocking public/private financing structures that link investments to the sustainability goals of a particular territory, in this case the Metropolitan Region of Amsterdam (MRA).

Driven by Metabolic, Impact Hub, and Banker Without Boundaries, the CIC program has a number of key elements and objectives.

- **Accelerating the transition to a circular economy:** The circular economy (CE) is an economic model for sustainable consumption and production. Due to overconsumption and overproduction within a linear model, more raw materials are extracted and more waste is produced every year. Many companies now recognise that this trend can and must be broken, according to the principles of the circular economy. No single CE company can transform an entire sector. To drive systemic change in any high-impact sector, innovation is required throughout the value chain.

- **Systemic value chain approach:** A single company cannot bring about systemic change; it requires multi-stakeholder collaboration to realize systems transformation. To bring about that system change, the CIC program focuses on accelerating the scaling of 5-10 circular innovations, within companies that act synergistically to increase the circularity of an entire value chain. Instead of strengthening individual circular solutions, the CIC approach consists of a full value chain approach. With the value chain as a starting point, CE innovation gaps are identified and filled through targeted matches with startups, as well as innovative transformation of existing businesses. The program aims to help these initiatives scale and accelerate the transition.

- **Innovative financing mechanisms:** Scaling up high-value circular solutions and overcoming barriers to financing circular business models, requires the development of innovative impact-based financing mechanisms.[1] It is important that funding is linked to concrete impact results of the cohort of companies, as this shifts decision-making and portfolio management from short-term profit to long-term impact. Blended finance structures are leveraged to overcome known systemic barriers for CE-businesses.

- **Regions as challenge owners:** The regional approach of the CIC makes it possible for companies to form a local circular chain together. The geographical delineation allows us to map out a value chain, connect stakeholders and thus work collectively on circularity.

- **Replication and education:** The three partners in the CIC want to accelerate the transition to a circular economy. Therefore, the program will be aimed at scalability. In support of that the CIC will produce a series of blueprints, to serve as a practical guide for developing other local circular innovation ecosystems. The blueprints can then be applied to accelerate the transition of other value chains within the MRA. Subsequently, the **blueprints** will be offered to other municipalities in the Netherlands and beyond.

- **Creating high-value circular jobs:** Higher R circular enterprises have the potential not only to address acute environmental and socio-economic challenges, but also to unlock tremendous circular employment opportunities and support regional employment and economic strategies. As such, a core outcome of the CIC program is to create 20-40 high-quality jobs in the Metropolitan Region Amsterdam, to stimulate the Dutch labor market, and to propel regional sustainable urban economic development.

[1] *Financing Circular Economy Innovation in the Netherlands, Metabolic, 2021*

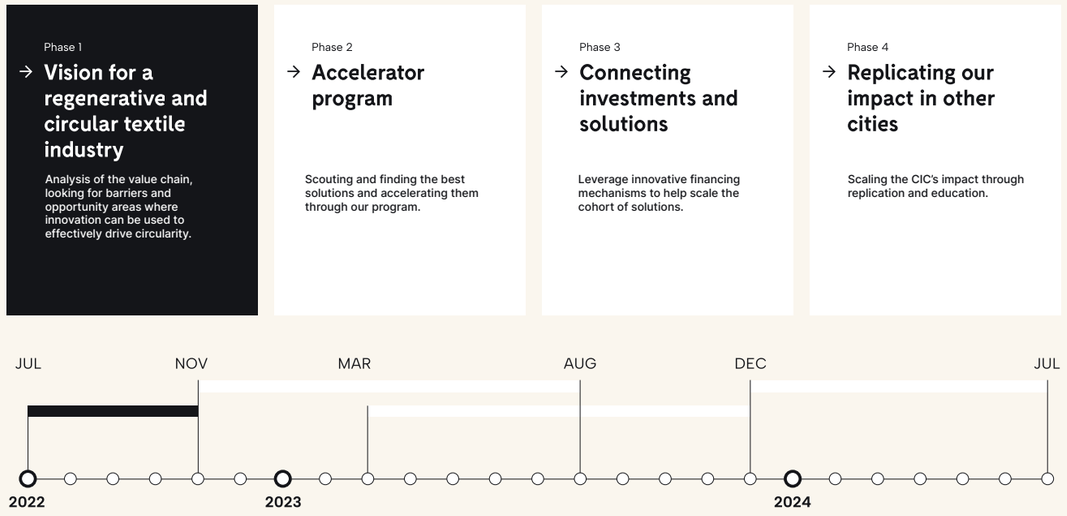


Figure 2: *CIC's program approach*

Our approach for phase 1

This report was built iteratively by the CIC partners, and in collaboration with local stakeholders and global fashion experts. A state-of-the-art review was first conducted on circular and regenerative textile systems, and associated theory of changes and visions to gather the best knowledge on the topic. Local knowledge and insights were gathered by collecting recently published vision documents and reports from past local projects, by interviewing local stakeholders that work daily on textile initiatives in the region, and global thought leaders based in Amsterdam that work on circular fashion.

A Theory of Change, grounded in the vision, goals, and objectives of the region are the main outputs of this first phase. This process enabled the CIC program to identify key innovation opportunities that should be activated for the local textile system to transition towards circularity. Four "Opportunity Areas" highlight key focus points for the CIC program to target in its search and selection of ventures, and supported by the holistic vision laid out in this report.

2. Envisioning a circular and regenerative textiles sector for the city of Amsterdam

Achieving 70% circular textiles by 2030 - through establishing an inclusive community of designers, producers, and citizens that effectively leverage the R-strategies to work towards systemic change

The textile sector plays an important socio-economic role in European industry and civil society, where textile products and services feature ubiquitously in the everyday identities and communities of citizens across Europe. The textiles sector covers a myriad of products including apparel, home textiles, and technical textiles (including workwear). Although each unique in their specific requirements, functions and trends - material innovation, infrastructural needs, and new business models for circularity will cross-cut and connect many different textile products for an effective transition to a circular state. For the CIC Amsterdam Pilot, there is a particular focus on apparel as these products have made up over 60% of global textile use in the last 15 years[2], and clothing and home textiles discarded after the use phase account for 85% of the total textile waste.[3]

The unique interconnected nature of cities, as hubs of creative communities and citizen behavioral patterns, can be leveraged to rapidly experiment, replicate, and disseminate new business models and approaches for product-service systems. Cities are impact hotspots with acute circular economy challenges that can be the focus of systemic innovation. Within the CIC program, we will explore how cities can help to develop critical "niches" within the local textile industry that can drive towards radical systemic change[4]. Urban areas like the Metropolitan Region of Amsterdam (MRA) have become visionary agents - setting the pace and inspiring others to follow suit by proposing ambitious targets to create a circular textiles system.

With a thriving community of designers, brands, innovators, and citizen initiatives within the MRA, the textiles industry provides a ripe opportunity for systemic change in design, manufacturing, and mindset. Over the last few years, the MRA and the city of Amsterdam have been developing local circularity strategies for the textiles sector, and demonstrating the potential of circular textile interventions through projects such as REFLOW.[5] The CIC Amsterdam Pilot contributes to the ambitions of the city and the MRA to drive forward bold and mutually supporting innovations that deliver measurable beneficial outcomes. The CIC vision builds upon the wealth of existing thought leadership across the industry[6] and strategy development in the City of Amsterdam and MRA, and reflects the influential and dynamic nature of the industry, and its importance within the cultural and social fabric of society.

Through its vision and roadmap the MRA has positioned itself as a frontrunner in bringing material flows into a circular system within the city and region, based on two clear action areas:

- **Circular aesthetics:** Raising awareness on the behavioral change of designers and citizens, and creating a central place for pioneers in circular textiles.
- **Upscaling of recycling:** Strengthening circular loops through the upscaling of textile collection, sorting and high quality recycling systems.

Aligning with the higher R-strategies, we have proposed some key themes to (i) enable circular material flows, (ii) ensure diverse, distributed and inclusive opportunities for prosperity and decent work, and (iii) protect human and planetary health. Interwoven with the circular material cycle, we wanted to reflect the regulatory structures, human systems, and cultural aspects that should be keystones of a holistic circular system. These aspects are summarized in the next sections and can be crystallized around four different dimensions.

[2] A New Textiles Economy, Ellen MacArthur Foundation, 2017

[3] Scaling textile recycling in Europe—turning waste into value, McKinsey & Company, 2022

[4] The Transition to Good Fashion, Drift & Fashion For Good, 2018

[5] REFLOW, Textile (Life)cycling, 2020

[6] Vision of a circular economy for fashion, Ellen MacArthur Foundation, 2020; Circular Economy Action Agenda: Textiles, PACE, 2021; Preferred Fiber and Materials Market Report, Textile Exchange, 2022

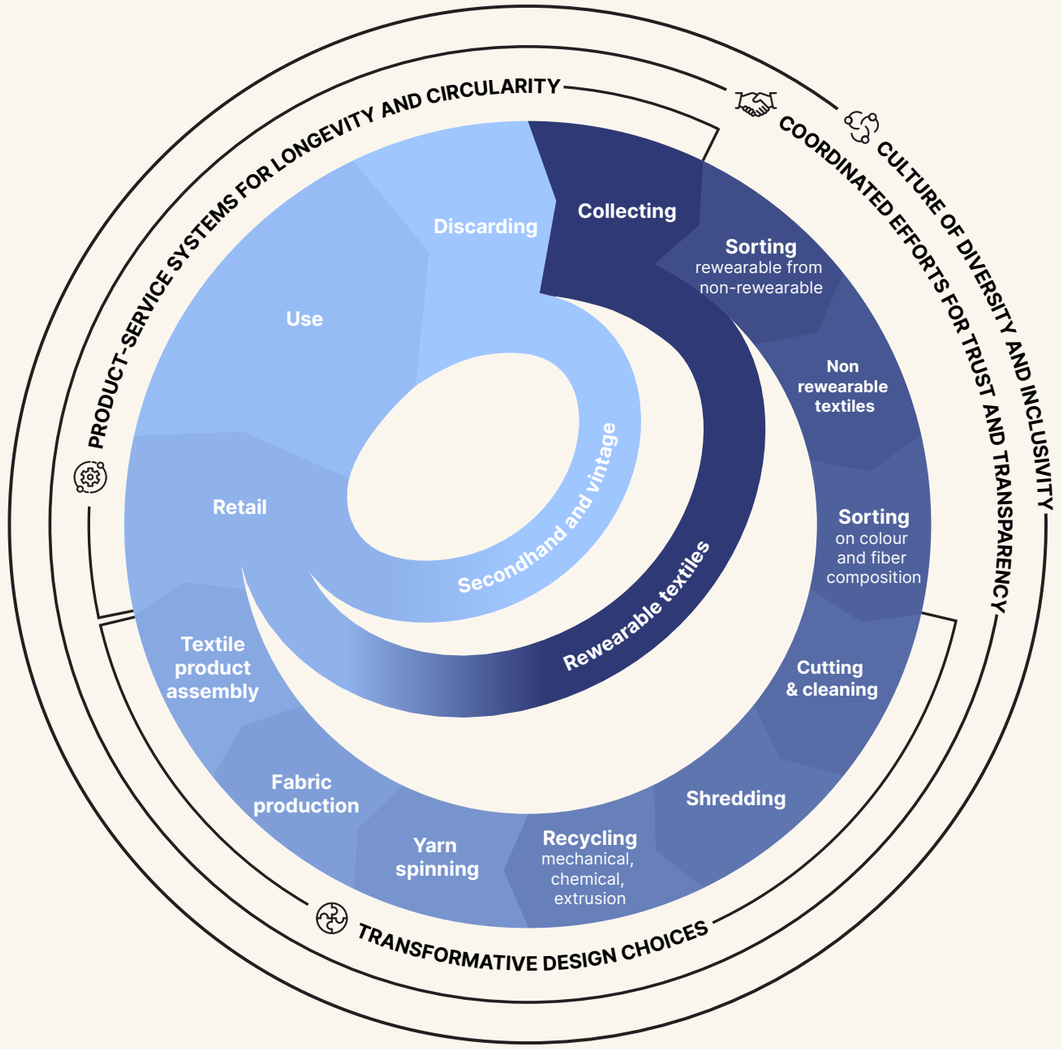


Figure 3: *Vision of a circular textile system, adapted from the textile wheel in the MRA roadmap, 2022*[7]

[7] Circulair textiel visie en routekaart MRA, Amsterdam Economic Board and Metabolic, 2022

PRODUCT-SERVICE SYSTEMS FOR LONGEVITY AND CIRCULARITY

Extending the active life of garments through design, use and reuse has been identified by lifecycle assessments as the single most effective intervention in reducing the overall impact of the clothing industry.[8] Rather than looking at products in isolation, textiles should be designed with the complementary B2B, B2C and C2C services in mind, helping citizens to buy into a holistic circular mindset when they purchase. Expert knowledge across diverse disciplines along the supply chain should be woven into robust product lifetime strategies that are aligned across the industry.

- **Extended use phase:** Citizens feel deeply connected to the garments they own and significantly increase the number of wears per item.
- **Act of buying as a long term commitment:** The citizen experience in choosing and purchasing clothing encourages the mindset shift towards commitment and trust in the product and supporting services. Garments no longer feel like they need to be replaced regularly due to short trend cycles but are instead valued objects that citizens care for and pass on.
- **Appropriate care and maintenance:** Citizens are provided with clear and accessible information on the best practices for cleaning and maintaining the quality of their clothing. Each item of clothing has dedicated care instructions, including washing and drying methods; and spare parts that can be easily replaced.
- **Repair and customisation:** An abundant ecosystem of circular services for repair, maintenance, and customization is readily available and affordable for all citizens, distributed across the MRA in local communities. Citizens have access to tools that help them fix their own clothing through local hubs and repair cafes, or dedicated services for more complex repairs or customization services.
- **Passing on and swapping:** Citizens are part of communities of clothing exchange and handing down, ensuring that high quality clothing is accessible to those in need. Initiatives such as the SwapShop chain are well established across the MRA and incentivises citizens to trade their unwanted clothing through local services.
- **Accessible textile collection systems:** Robust textile collection infrastructure and services are available to incentivise citizens to separate apparel and shoes from other municipal solid waste streams, and divert the streams away from incineration and landfill. Collection and sorting systems are also used to phase out materials of high concern from technical loops, whose capacities and capabilities are reflected in the choices made at the design stage of new garments.
- **Recommerce and reuse:** A range of affordable options for high quality second-hand clothing are readily available across the MRA.
- **High value materials are recaptured through refurbishment and remanufacture** will further retain the embodied economic value and resources within garments at the component level. Commonly purchased items become standardized in their design for remanufacture. The municipality collaborates with brands to provide shared infrastructure to refurbish and remanufacture (parts of) used textile products. This will apply to both fabrics and haberdashery components (buttons, zips, etc.).
- **Designers tap into resources for upcycling:** For garments which are deadstock or cannot be resold, local designers can use the high quality materials and components to produce new unique garments.

[8] *Design for Longevity: Guidance on Increasing the Active Life of Clothing, WRAP, 2013*

TRANSFORMATIVE DESIGN CHOICES

In both material and product design, the upstream choices should reflect consideration and care for both people and planet. Design is a hugely influential tool to bring circular and regenerative strategies into citizen experience and attachment to their clothing.

- **Responsible material design choices and inputs consider the full lifetime of the product:** ensuring that any synthetic or treated biobased materials do not cause unintended harm to local ecosystems (via pollution to water, air and soil). The design community within Amsterdam and the MRA prioritizes the following principles and aligns with other supply chain partners to ensure that circular pathways can support their design choices. Textile sorting systems are also used to phase out problematic materials from technical loops and redirect those material streams to decomposition pathways for conversion to biocompatible materials.[9] The capacities and capabilities of these sorting systems are reflected in the choices made at the design stage of new garments.
- **Safe-by-design principles:** These principles become the common standard for designing all fiber types and additional chemistries.[10] Fabric design includes responsible formulation strategies that prevent harm to workers' health during production, and ensure bulk fibers or chemical additives can be recovered easily with low-impact processes at the end of a garment's useful lifetime.[11] The interconnected nature of Earth system processes is respected in the choice of materials that will inevitably shed or fragment into water or soil systems.[12]
- **All biobased fibers are produced regeneratively:** Brands and manufacturers in the MRA support producers in the extended global supply network to adopt restorative principles which actively support soil health, biodiversity, and animal welfare, and align with agricultural production systems to ensure the most responsible interaction (input and extraction) with landscapes.
- **Materials and garments are designed for high circularity potential:** Systems are in place to effectively cycle all resources coming into technical systems (water, heat, solvents).
- **Versatile end-of-life strategies:** An ecosystem of end-of-life technologies exist to ensure that all non-rewearable textiles (synthetics, natural fibers, blends) can be processed locally and recirculated into new fibers or into products across other local industries.[13] All materials that are exported are of high quality for reuse and of material composition that can be handled safely in other locations.

[9] *The Nature of Fashion, The Biomimicry Institute, 2020*
[10] *Self regulation: a fashion fairytale, Greenpeace, 2021*
[11] *Safe Chemistry Innovation in the Textile and Apparel Industry, Safer Made & Fashion for Good, 2018*
[12] *A sustainable and resilient circular fashion and textiles industry, Stockholm Resilience Centre, 2021*
[13] *Mechanical, chemical, biological: Moving towards closed-loop bio-based recycling in a circular economy of sustainable textiles, Ribul, M. et al., 2021*

COORDINATED EFFORTS FOR TRUST AND TRANSPARENCY

Improving information flows along the supply chain is critical to cement circular and just practices, and build trust across the global network of actors. Clear and understandable communication lines will be vital for systemic impact along the full value chain.

- **The fashion industry and general public are aligned on key terms:** Terms such as biodegradable, biobased, and regenerative, should be clearly defined to ensure that businesses and citizens make informed purchasing decisions. Disruptive innovation is supported by standardized measurement techniques and certifications for products that create safe material cycles.
- **Scientifically robust approaches for cross comparing products are aligned across the industry:** The industry is centrally aligned on the most appropriate tools and impact calculation frameworks for measuring up-to-date social and environmental impact. Claims on sustainability cannot be made without traceable and publicly available evidence using these tools. The metrics presented to citizens are comparable between organizations.

CULTURE OF DIVERSITY AND INCLUSIVITY

Textiles are inherently about expression, identity, community, and craft. To achieve the holistic vision for the industry, the culture and mindset of inclusivity and diversity is necessary to shift the actions of multiple stakeholders including designers, manufacturers, and citizens.

- **Decent circular jobs:** Throughout the entire value chain, decent circular jobs are created with inclusive, safe, and healthy working conditions, as well as equitable and fair wages. The principles for a just and distributive economy stretch beyond the MRA, to global supply chains that support the Amsterdam textile economy, from material production through to post-consumption processing.
- **Negative externalities of textile supply chains are eliminated:** Fashion supply chains reduce social and environmental impacts that occur as a result of production, retail, and post-consumption stages.[14] Decision making about localized circular textile innovation should also consider the wider implications of business models, infrastructure, and trends within the global textile landscape.[15]
- **Promoting slow fashion:** Businesses and citizens consider the resources and human efforts that go into every garment that is produced. Planetary and human health guide the design choices of the full product-service system.
- **Production of garments is responsive to demand and reflects care for human and planetary wellbeing:** The transition to using bio-based and recycled fibers is aligned with significant decrease in production and consumption of textile goods. Trend cycles are slowed down and there is increasing influence from smaller local designers creating timeless designs for people and place. Where possible, biobased fibers are sourced locally from the MRA region and the Netherlands, through the development of a local fibreshed.[16] Trend and production cycles are aligned with the natural rhythms of biological systems, ensuring ecological health and decent work in the localities of global suppliers.

[14] A sustainable and resilient circular fashion and textiles industry, Stockholm Resilience Centre, 2021
[15] Fossil Fashion, Changing Markets Foundation, 2021
[16] Fiber Vision, Fibreshed

3. Theory of Change: Building the transition pathway to 2030 and beyond

Driving towards the holistic vision of a circular and regenerative textile sector in the MRA will require significant and coordinated efforts across the network of actors and along the value chain activities. Imagining an ideal textiles system beyond the 70% circularity goal for 2030, will be important in the early stages of testing, integrating, and scaling innovation. Considering indirect effects and unintended consequences and making responsible choices in the long-term is essential for achieving the vision.

Considering barriers for the transition towards a circular system, we aim to identify key challenge areas within the textiles sector. As the starting point from which to identify these key challenges and potential systemic innovations, we integrated the existing Netherlands and MRA goals into a transition pathway.

The activities within each of the higher R-strategies should support and amplify each other in strengthening a circular and regenerative community within the MRA.

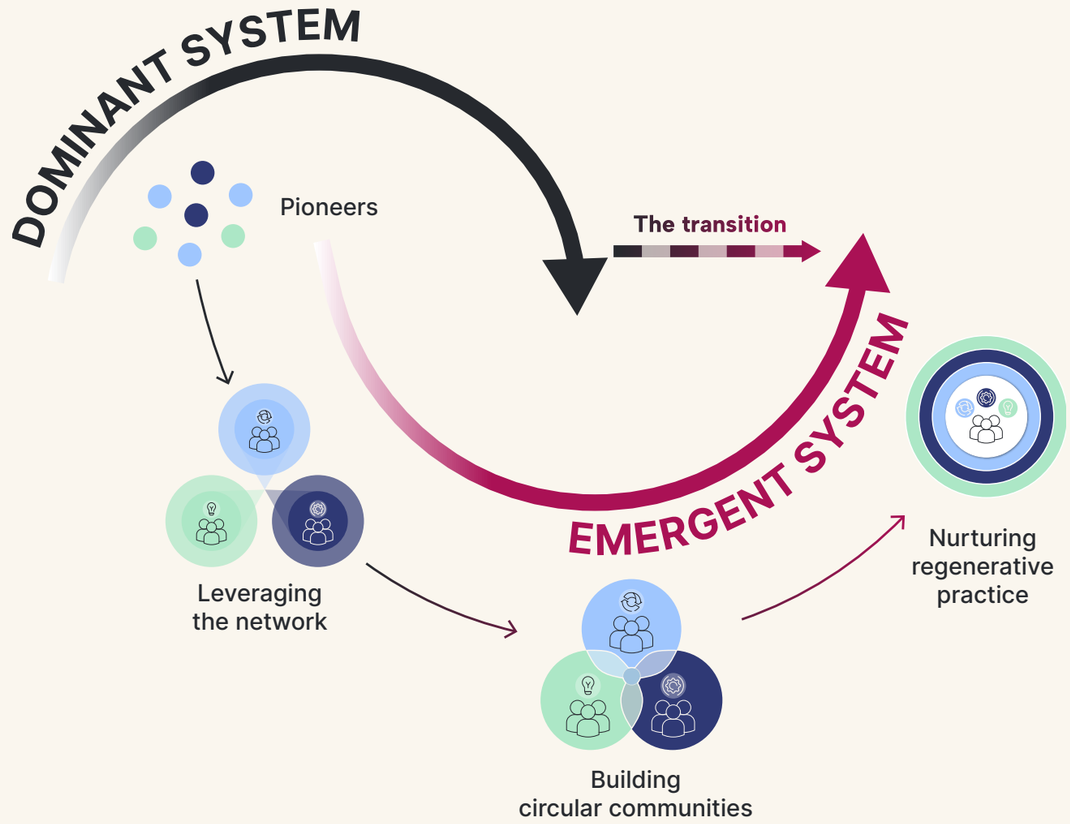


Figure 4: *Three stages of the Theory of Change for Amsterdam's textile sector, mapped onto the Berkana two loops model*[17]

[17] AfterNow: When We Cannot See the Future, Where Do We Begin?, 2017

SHORT TERM (UP TO 2025): LEVERAGE THE EXISTING NETWORK TO THINK SYSTEMICALLY ABOUT BEST PRACTICES

What are the short term opportunities? Where are there existing efforts and how can the connection of these efforts be strengthened? How can fragmented players be connected for collective action?

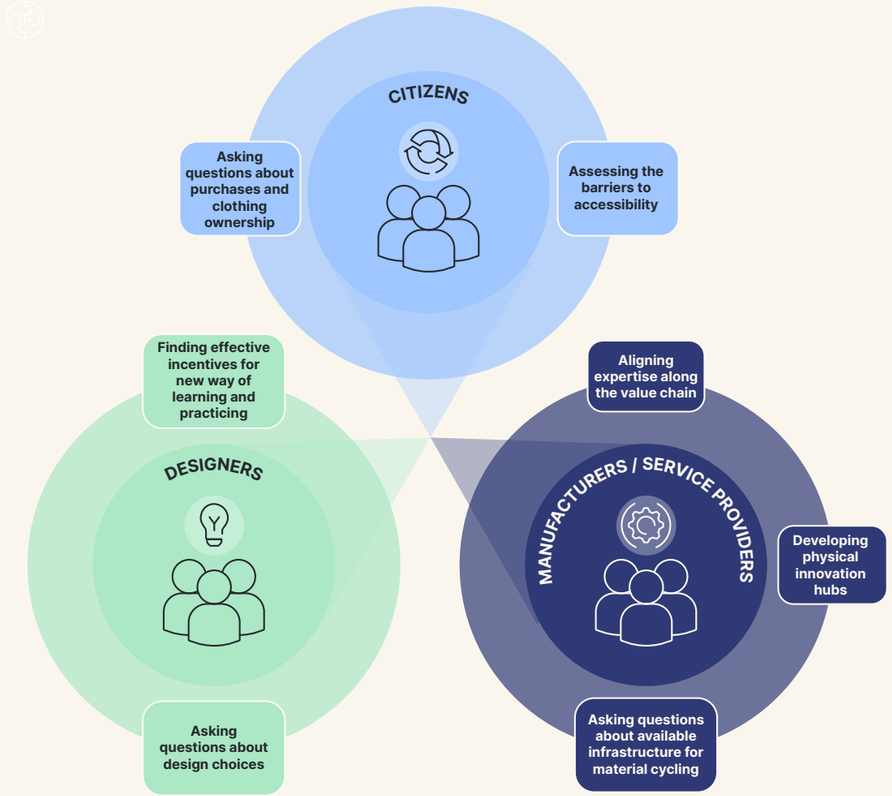
The textile industry is reaching a crucial tipping point, driven by the pressures faced by businesses from the policy and regulatory landscape, as well as by the citizens whose mindsets have shifted due to widespread media outcry against human exploitation and environmental damage from business-as-usual activities.[18] With the publication of the EU Strategy for Sustainable Textiles, the European textile sector has been pushed to re-evaluate and rethink its current activities[19], including identifying the urgent and necessary actions to be taken across multiple scales (local, national, and global).

Amsterdam is a frontrunner in the practical uptake and realization of new legislation at the regional level.[20] Collective action is building momentum - seen in the diverse pioneering activities and organizations within the MRA. The Theory of Change illustrates the instrumental importance of collaboration across the entire ecosystem to drive the transition towards the circular and regenerative state. To get a better understanding of the current state of the ecosystem, the relevant organizations, and their activities in supporting the circular goals of the city, we mapped the local stakeholders in the Amsterdam textile system. This was targeted research to obtain a snapshot of around 430 actors in the network towards the end of 2022, primarily focused on the Metropolitan Region of Amsterdam (MRA) and secondly on relevant stakeholders outside of the MRA, but still within the Netherlands. The stakeholder mapping helped position Amsterdam's state of development along this Theory of Change and serves as a backbone for the ecosystem development activities of the CIC program.

Aligned under the umbrella of "Circular Textiles Green Deals", the MRA has already begun to catalyze collective action in and around the city, for example the Denim Deal which unites parties in the value chain to increase the share of recycled textile use in the manufacturing process of new denim products.[21] It will be critical to harness this momentum and strategically align these efforts, as a way to disseminate best practices in the network.

Providing the space to question current practices and mindset will also engage local players in the co-creation of a long-term vision.[22] A great example of this for the region is the creation of a manifesto and platform around circular aesthetics, which provides a common space and shared language around circular fashion culture.[23] It will be important to further understand the underlying dynamics of social, knowledge, and economic capital amongst the local actors in the MRA, from independent repair services to large brands and fashion houses.

[18] *Why We Still Need a Fashion Revolution, Fashion Revolution, 2020*
[19] *EU Strategy for sustainable textiles, European Commission, 2022*
[20] *Amsterdam Circular Strategy 2020-2025*
[21] *Circulair textiel visie en routekaart MRA, Amsterdam Economic Board and Metabolic, 2022*
[22] *Earth Logic: Fashion Action Research Plan, Kate Fletcher and Mathilda Tham, 2019*
[23] *Circulair textiel visie en routekaart MRA, Amsterdam Economic Board and Metabolic, 2022*



ACTIVITIES	Integrating ecodesign principles into local education and training programmes that align the multidisciplinary skillsets of designers, makers, and manufacturers	Creating the conditions for fair, inclusive circular jobs through highly skill training programmes	Leveraging the connections between established consortia and Showcasing frontrunner innovators and helping them to develop general operations	Define the roles that support collaboration between diverse groups of stakeholders	Aligning on the necessary data points to disseminate impact activities Collecting environmental and social impact data on conventional materials and techniques to create a common benchmark	Working with citizens to ensure publicly accessible data is comprehensive Amplifying awareness campaigns and developing incentives for residents to buy into circular initiatives
OUTPUTS	Consortia of brands/designers pioneering circular principles Adoption of principles among small and medium-sized businesses	Forum to explore the needs of different vulnerable labor groups and the integration with the local textile sector	Inventory of existing platforms, incubators, influencers, organisations and key stakeholders and potential financiers	Local champions of circular activities	Innovators have the tools to communicate their positive impacts compared to conventional practices	Acknowledged information flows between brands and citizens, necessary for communication of needs and impact Local subsidised support schemes, resources and accessible information for all residents
OUTCOMES	Emerging grassroots connections made between circular designers, and specialised makers and producers	The local community is distinguished for systemic thinking around supportive, just and inclusive working conditions	Active collaboration and strong partnerships across product and service providers to design effective circular networks		Harmonised impact metrics across the companies within the MRA	Environmental and social impact become the key driver in purchasing decisions for businesses and citizens Circular services are an easy, accessible, and affordable choice

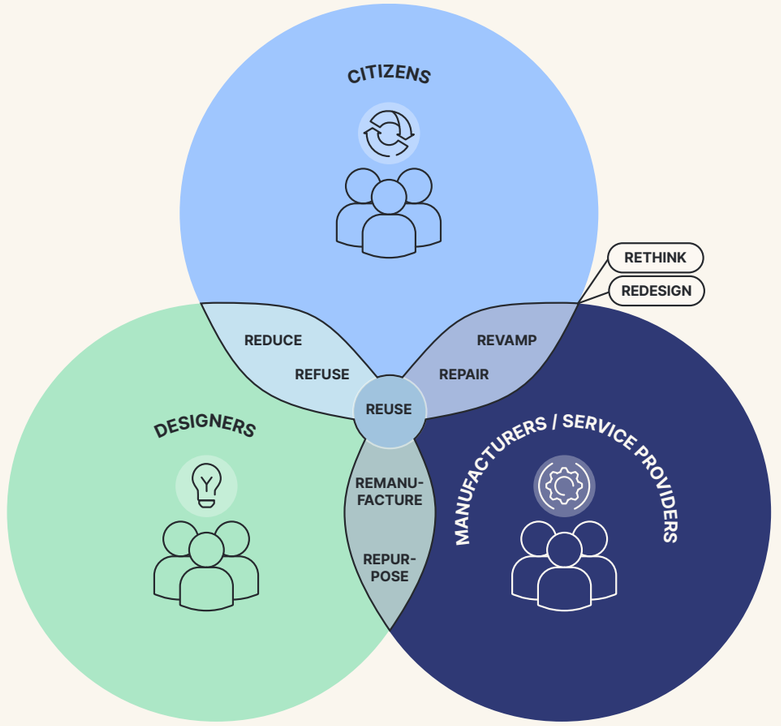
MEDIUM TERM (UP TO 2030): SOLIDIFY RELATIONSHIPS ACROSS THE R-STRATEGIES TO ESTABLISH RESILIENT CIRCULAR COMMUNITIES

How can innovation be leveraged to solidify relationships across the R-strategies? Which activities will cement and strengthen new business models and product creation processes?

Many of the 2030 goals set out for the MRA are focused on specific R-strategies and rely on multiple stakeholder coordination and buy-in for success. In creating aligned goals and communication lines in the short term, the fragmented actors and initiatives dedicated to individual R-strategies have been connected into a network. For this network to nurture emerging communities of practice, disruptive innovation should be strategically integrated with existing efforts.

The network becomes a testbed for new business models that tackle multiple impact areas along the value chain (materials, processes, business models, craftsmanship) and create rapid feedback loops between designers, implementers, and users. Data collection and communication lines are further strengthened by leveraging commonly agreed upon benchmarks against conventional practice. This could create a level playing field between big brands and small to medium-sized enterprises within the sector, but requires mandated data transparency and accountability driven by national and international policy.

Here we can see the role of programs and pilots such as the CIC, which actively align innovation gaps with the influential roles of both public and private organizations curating an innovation ecosystem. The innovation ecosystems can amplify the potential systemic impacts of novel products and approaches. Developing the narrative of textiles as an important cultural and social vehicle for circularity, the emerging community supports upscaling of specialized skill sets and strengthening of industrial and craft identity. To support this innovation ecosystem, local governments should prioritize building the enabling infrastructure and logistics to support circular strategies (R-strategies) in collaboration with regional businesses.



ACTIVITIES	Understanding performance characteristics of materials and the performance needs of products in the region			Demonstrating disruptive technologies that effectively use resources and renewable energy	Scaling pilots that purposefully build partnerships of expertise along the value chain, locally and internationally	Expanding infrastructure and services for textile collection (e.g. swapshops)	Developing accessible approaches and products for citizens to reduce and capture microfibres during the use phase
	Designing for the overall lifetime and use phase of the product	Aligning product design and material innovation with existing and emerging recycling infrastructure (locally and internationally)	Integrating timeless design and identity of local craft			Developing citizen experience around recommerce and reuse platforms (physical and digital)	Increased number of affordable repair and maintenance services distributed across the MRA, especially in marginalised communities
OUTPUTS	Recyclable and planet-conscious materials with recycled fibres	Commonly agreed upon material standards for recycling	Products that reflect local textile heritage or establish an identity of future craft culture	Network of technologies to ensure sufficient feedstock from non-reusable textile is available for circulation into new products	Open access blueprints of best practices and learnings from value chain collaboration	Easily accessible information and services for textile care, maintenance, repair and separation	
OUTCOMES	Products are no longer designed in isolation: product-service systems become the norm that place human and planetary wellbeing at the centre of decision making				Job creation through new local and international producer and maker communities	All textiles collected separately across the MRA	Citizens have access to high quality, durable and affordable garments and the services to support their longevity

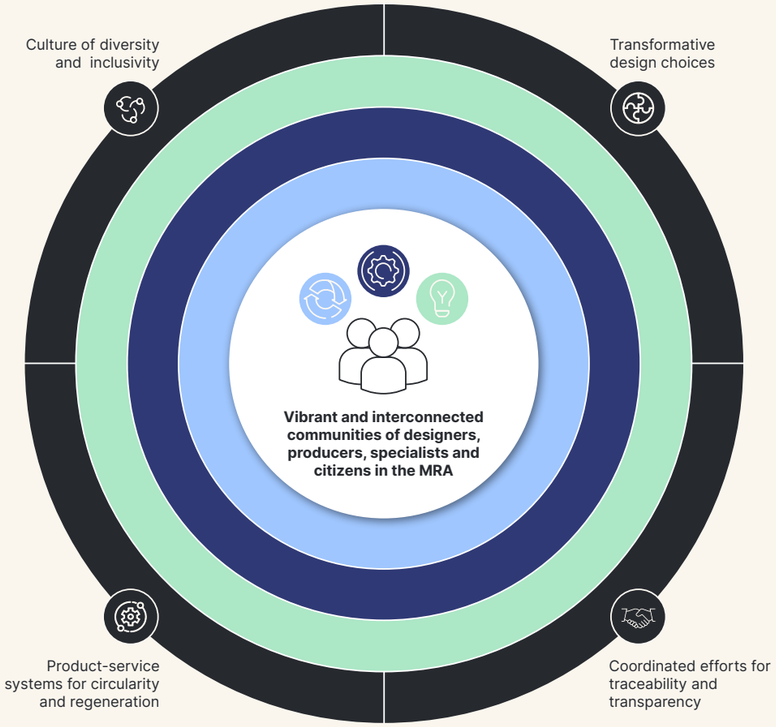
LONG TERM (BEYOND 2030): CO-DESIGNING A TEXTILE SYSTEM THAT CATALYZES REGENERATIVE PRACTICES TO SUPPORT THE BIOSPHERE

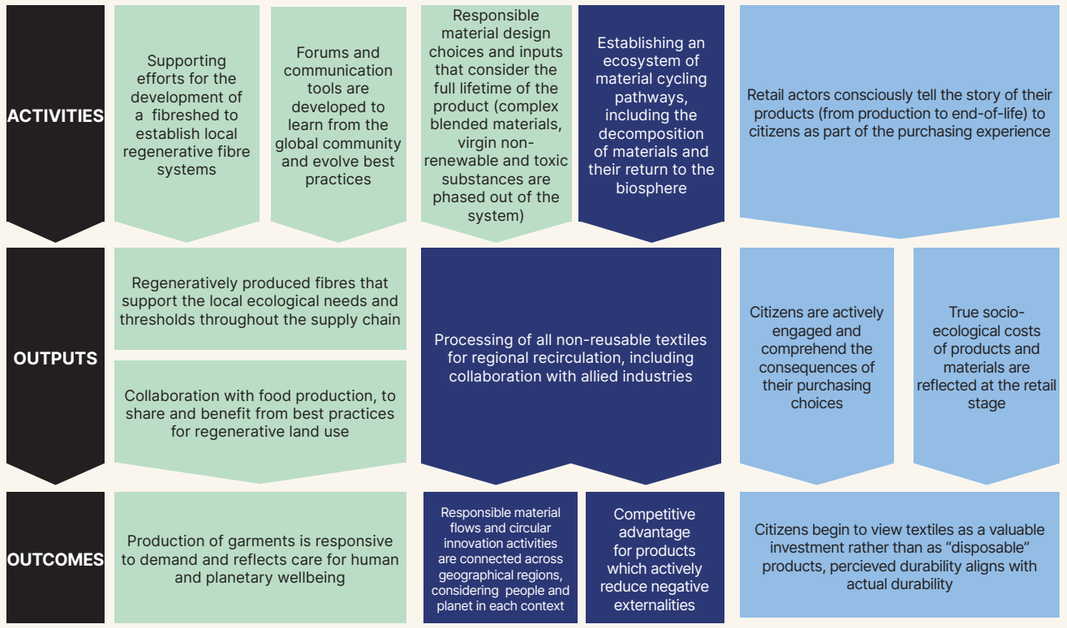
How do mid-term outcomes and activities come together to contribute to achieving the vision for a circular textile industry? What are the long-term enablers needed to make circular and regenerative practices the norm?

The community built to reach 70% circular textiles industry by 2030 forms the foundation for a resilient circular and regenerative system beyond. Keeping the vision in mind from the start and focusing on solutions that fully align with it can minimize backlash and prevent (newly created) barriers for the final part of the transition towards a locally adapted, globally responsible fashion system within planetary boundaries.

In order to achieve this, nature-positive decision making is required across the entire sector, as a collaboration point for local organizations and their wider supply chains. Locally mandated ecodesign guidelines and waste management directives ensure that material flows are responsibly created, maintained and handled at the end of their useful lifetimes. In addition to contributing to restoring natural ecosystems, the sector contributes to strengthening society. Decent green jobs focused on local craftsmanship are created in a diverse and inclusive industry, supported by accessible educational and training programs.

The pillars laid out in the vision are adopted and refined through dialogue amongst local actors, who in turn catalyze systems change within their own networks. The city of Amsterdam develops itself as a pioneer through sharing best practices, and as an important proofpoint of urban and industry collaboration. The city and region demonstrate the potential for positive impact through the platform of textiles as the intersection of material and culture.





4. Opportunity Areas

Through research and interviews, we identified some of the systemic barriers within the local system to not only achieve the circularity goals for the MRA by 2030, but also establish long-term relationships and activities beyond. The figure below highlights some of these barriers faced by citizens, designers, manufacturers and circular service providers.

The following four opportunity areas were identified for transitioning the Amsterdam textiles industry to a more circular and regenerative state. As a European center of design with an abundance of small and medium enterprises, as well as the headquarters of many major global brands, Amsterdam already has an influential network to be activated for change. With many of the higher R-strategies being closely linked to the behavior change of designers and citizens, the CIC program will focus on developing the physical and emotional durability of textile products, supporting the MRA's vision to achieve a major paradigm shift in how citizens access, care for and recirculate textiles.

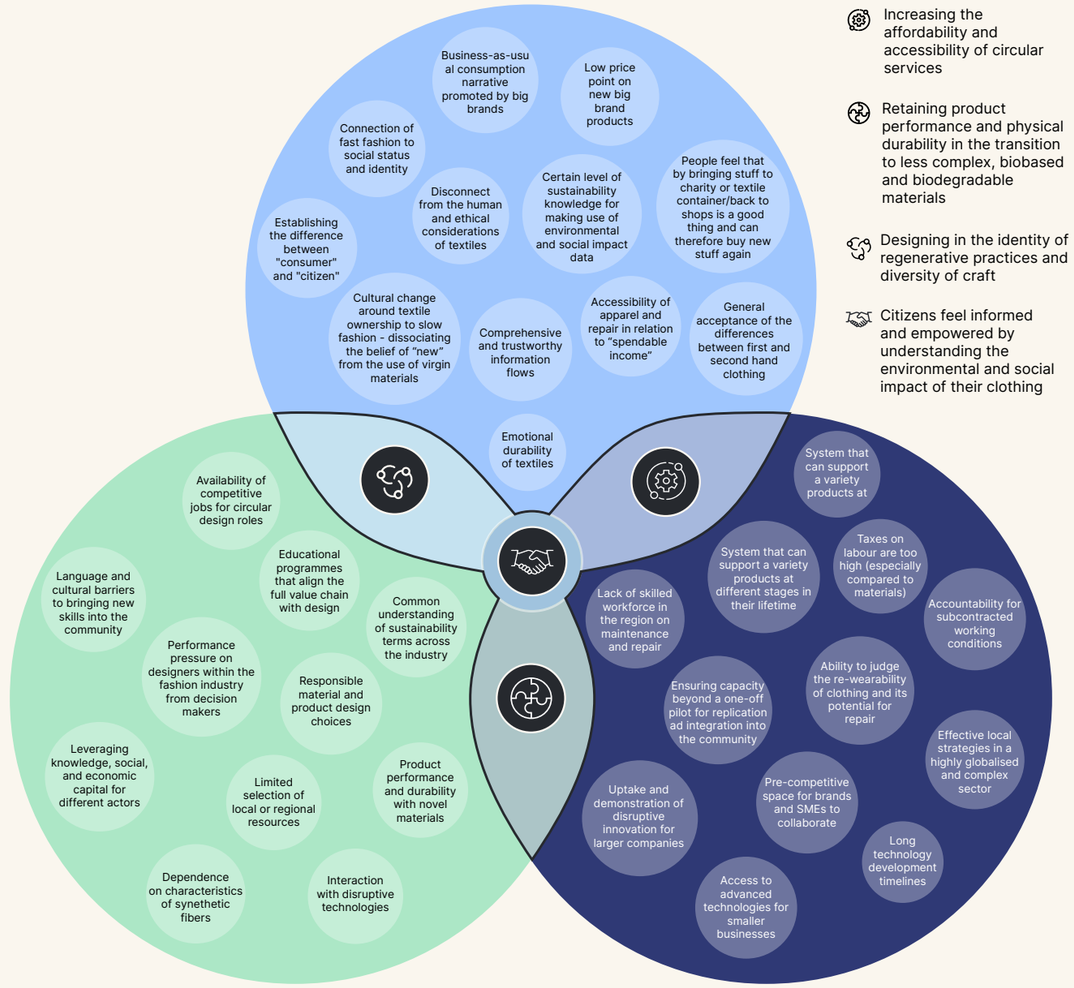


Figure 5: *Opportunity areas for innovation focused on overcoming the barriers for a circular textiles system across all three stakeholder groups (designers, manufacturers/service providers, and citizens)*

PRODUCT-SERVICE SYSTEMS FOR LONGEVITY & CIRCULARITY

Opportunity Area #1:
Increasing the affordability and accessibility of circular services

Increasing the utilization of textile products has been identified as a high potential area for impact reduction, and also driving the mindset shift of citizens to decrease their consumption. Furthermore, maintenance and repair are critical activities during the use phase to support the viability of other circular business models such as rental and resale by keeping clothing in aesthetically pleasing and rewearable condition. There is a budding network of local services for repair, customisation, and upcycling within the city of Amsterdam. However, increasing the awareness of and improving the access to these fragmented services for many citizens is an ongoing collaborative effort.

EDUCATING CITIZENS ON THE STEPS THEY CAN TAKE TO CARE FOR, MAINTAIN, REPAIR, CUSTOMIZE, OR UPCYCLE THEIR EXISTING CLOTHING

- Creating knowledge platforms for citizens to understand the appropriate ways in which they can care for and maintain their clothing to prolong its lifetime, and help decrease the perceived difficulty of repair.
- Working with brands to develop services to increase citizen accessibility to materials (such as spare parts) and methods of repair.
- Increasing the clear and accessible information for citizens on brand and retail services for repair, customization and remanufacture and independent services provided across the MRA.
- Working with citizens to understand how to adjust the expectations about what a repaired product will look like or how long it will take to complete certain types of repair.
- Encouraging citizens to rethink their relationship with their clothes to embrace the role that repair and customization play in local craftsmanship and personal individuality.

INCREASING THE ACCESS TO AND AFFORDABILITY OF CIRCULAR SERVICES PROVIDED WITHIN THE CITY FOR ALL CITIZENS

- Exploring viable options for scaling textile collection infrastructure and campaigns to encourage citizens to separate all textile materials from other municipal waste.
- Supporting the network of repair cafes to nurture informal citizen-led maintenance and repair.
- Collaborating in the development of robust reverse logistics[24], and ensuring the fair geographical distribution of affordable services across all members of the community.
- Aligning citizens with repair and maintenance services so that products can be repaired throughout their full useful lifetime, making the appropriate routes clear between brand repair services and the network of independent repair service providers.
- Reflecting the true cost of producing new textile products in the price tag, to further support the affordability and attractiveness of using a repair service by decreasing the relative price point compared to purchasing a new product.

[24] *Social and Cultural Aspects of the Circular Economy : Toward Solidarity and Inclusivity, pp. 136 – 159, Suarez Visbal, L. et al., 2022*

TRAINING A HIGHLY-SKILLED WORKFORCE TO JOIN A SUPPORTIVE COMMUNITY OF CIRCULAR SERVICES

- Increasing educational and training programs, getting students and designers to rethink the important role that repair and remanufacture have within the industry, including knowledge exchange to bring new craft, repair and customisation skills into the MRA.
- Strengthening and incentivising reskilling and upskilling programs within the MRA for advanced sewing and apparel repair skills.
- Developing programs that incorporate knowledge exchange on specific textile value chain processes from design, production and recycling.
- Aligning brands and manufacturers with the repair market through the provision of technical instructions, and expected lifetimes of components.[25]

Inspiring examples:
The Swapshop, Makers Unite, United Repair Centre, MENDED, De Steek, A-GAIN guide, Save Your Wardrobe, The Renewal workshop, repaircafe.org, ApparelXchange, Rumage

[25] *Repair motivation and barriers model: Investigating user perspectives related to product repair towards a circular economy, Terzioglu, N., 2021*

TRANSFORMATIVE DESIGN CHOICES

Opportunity Area #2:
Retaining product performance and physical durability in the transition to less complex, biobased and biodegradable materials

Emotional durability is linked both to extending a product's lifetime but also to the **trust** and **investment** that citizens make in the products that they purchase. With the increasing awareness of microplastic pollution, citizens are looking for clothing that delivers on durability and performance, while also tackling the more systemic issues of microfibre release and biodegradability. There are a lot of opportunities for next generation plant-based and biofabricated materials, and their potential should be considered in combination with increasing product longevity and significantly decreasing textile production. As we align citizens' values more closely with natural material cycles, they will become increasingly aware of how materials are taken and returned to the biosphere. This opportunity area cross cuts both MRA spearpoints 1 and 2, through the intersection of novel material design and responsible material cycling (including recycling) infrastructure.

SCALING DISRUPTIVE NATURAL MATERIAL DESIGN AND PRODUCTION PLATFORMS

- Working with the established community of designers in Amsterdam to drive forward the testing and prototyping of novel materials.
- Supporting underserved product applications of next-generation materials[26], through understanding the performance needs and characteristics of commonly purchased products
- Working with material designers to develop and integrate sustainable alternatives to petroleum-based and hazardous binders, additives, dyes, and finishes that provide aesthetic and performance characteristics to finished products.
- Working with designers and manufacturers to find appropriate product creation processes that consider how material structure and functional chemistries can affect human and environmental health.
- Exploring inventive design approaches that apply different design and manufacturing approaches, and allow for effective use of recovered and recycled materials (e.g. new pathways for recovered cellulose by adjusting the spinning and finishing techniques).[27]
- Helping to identify new feasible biofeedstocks and match them with appropriate processing innovation.[28]
- Working with novel material designers to collect data necessary to compare to conventional material design, and the associated environmental impacts at the manufacturing, use, and end-of-life stages.

ENGAGING CITIZENS IN THE POSITIVE ENVIRONMENTAL BENEFITS AND FUNCTIONAL PERFORMANCE OF NATURAL MATERIALS

- Working with citizens to understand the trade-offs between function, aesthetics, and sustainability in purchasing decisions.
- Demonstrating high quality and longevity in commonly purchased products, to increase trust of consumers in novel materials.

Inspiring examples:
Living Colour, Dyecoo, Fibral Material Alliance, Natural Fiber Welding, OceanSafe, Bolt Threads, Material Innovation Initiative: Disruptive Textile Technology List, Pangaia, Renaissance Fiber

[26] *Next-Gen Materials White Space Report 2021, Material Innovation Initiative, 2021*
[27] *Regenerative Textiles: A Framework for Future Materials Circularity in the Textile Value Chain, Ribul, M., 2021*
[28] *Next-Gen Materials White Space Report 2021, Material Innovation Initiative, 2021*

COORDINATED EFFORTS FOR TRUST & TRANSPARENCY

Opportunity Area #3:
Citizens feel informed and empowered by understanding the environmental and social impact of their clothing

With the rapidly changing market of fashion trends and alternatives, sustainability claims are being pushed into the consumer space. Frameworks and tools are needed to navigate the claims made by brands, and bring citizens transparent and accurate information about the impact of their products, building trust and integrity in their purchasing choices. These tools should also be used to support the broader network of SMEs and microbusinesses in collecting data and measurements to promote the circular business models, and strengthen local community buy-in for service provision by smaller businesses. This opportunity area will be enabled through European and national legislation to ensure non-financial impact reporting, due diligence, and comparable information captured in digital formats.

EMPOWERING CITIZENS WITH ACCURATE AND ACCESSIBLE INFORMATION

- Building on the work of REFLOW through educating citizens about the material impact of their textile items, using commonly used and clearly defined sustainability terms. Empowering citizens with information that helps them to refuse purchasing items of negative environmental and social impact.
- Strengthening data collection efforts for all conventional and emerging disruptive materials, processes and business models.
- Creating local pledges amongst brands and manufacturers for traceability and transparency that allow citizens to easily identify organizations to trust on their sustainability claims.

HELPING LOCAL CIRCULAR BRANDS AND MANUFACTURERS TELL THE FULL STORY OF THEIR PRODUCTS AND SERVICES

- Working with local industry leaders to align on the types of data and certification needed to substantiate key circularity and sustainability terms.
- Supporting circular service providers in collecting data to show the benefits of their practices and business models, and establishing processes and platforms to share this information with citizens.
- Capacity building and developing resources for digital technologies within SMEs collaboratively. Working with SMEs to develop approaches for engaging their own suppliers in data collection and management.
- Setting up traceability schemes for local and regional cycles of materials, to create a comprehensive data ecosystem.

Inspiring examples:
Compare Ethics, circular.fashion, Fashion Checker, EON

CULTURE OF DIVERSITY AND INCLUSIVITY

Opportunity Area #4:
Designing in the identity of regenerative practices and diversity of craft

Local textiles industries will need to weave together craft history and craft future, allowing for the cross-pollination of local and international cultures and the formation of new unique identities.[29] Through connecting emerging tools and technologies with the practices and value of craft heritage, Amsterdam can shape its new industrial paradigm.[30] These practices of sharing culture and craft will contribute to citizens feeling they have unique pieces of clothing that embody workers' time, skill, and story. This opportunity area closely aligns with the development of the circular aesthetics platform, creating and deploying different tools to continue behavior to change, and supporting contemporary craft. The city of Amsterdam can place itself as a flagship city actively integrating circular economy principles with a critical social and cultural foundation, by fostering gender equality and inclusion, fair wages, and safe working conditions.

TOOLS FOR EFFECTIVE EXCHANGE OF PRACTICAL CUSTOMIZATION AND SKILLS BETWEEN LOCAL AND INTERNATIONAL STAKEHOLDERS

- Supporting local skilled labor to strengthen the textile heritage that is connected to place and culture through repair and customization services for citizens.
- Including citizens in product and service repair and customization (on-demand) to reflect individualities and local craft.
- Normalizing repair / remanufacture as part of the continuous "story" related to items of clothing.
- Developing interesting techniques for repair and customization, and creating new 'aesthetics' that place visibly mended or upgraded as a form of activism and continued connection to the product.
- HIghlighting human effort and story into the intentional design for longevity and quality.

REIMAGINING DESIGN AND MANUFACTURING CYCLES

- Linking designers to available discarded materials for remanufacturing into new garments.
- Promoting regional craftsmanship and strengthening regional manufacturing linked to the identity and respect of local ecosystems.[31]
- Strengthening the storytelling around the community social impact of circular services within the region.
- Ensuring that the beneficial design and production practices nurtured by local craft communities are reflected in data sharing activities. Supporting local and international craftspeople with data collection and management.
- Connecting regenerative raw material producers to designers through establishing practices for local regeneratively produced fibers to build a new culture of regional fiber systems.[32]

Inspiring examples:
Textiel Factorij, Fibershed Nederland, NOORISM, Yaccabe, The Regional Fiber Manufacturing Initiative

[29] *Earth Logic: Fashion Action Research Plan, Kate Fletcher and Mathilda Tham, 2019*
[30] *CENTRINNO: A new industrial revolution that puts citizens at the core of sustainable transformation, Commune di Milano, FabLab BCN, IAAC, 2021;*
Crafting Smart Textiles – a meaningful way towards societal sustainability in the fashion field?, Kuusk, K. et al., 2012
[31] *The Regional Fiber Manufacturing Initiative, Fibershed*
[32] *Fiber Vision, Fibreshed*

5. Next steps

The resulting opportunity areas for the city of Amsterdam and the broader MRA provide the foundational focus for the next stages of the CIC program. Concretely building upon the insights of this phase of work, the CIC program will work over the coming months to find, scout and onboard innovative solution providers from across the world that can help drive change in these opportunity areas. From a wide group of companies, the CIC will leverage a stringent selection process and welcome a cohort of 5-10 ventures to partake in the CIC accelerator program. Throughout the program, they will receive the training, connections and networking abilities for collaborating with the relevant local stakeholders within the textile value chain, and collaboratively drive the Theory of Change.

Beyond acceleration, the CIC will aim to scale the impact of the portfolio of solutions using innovative financing structures. These will bring together the most effective elements of private and public instruments needed to overcome key barriers to financing circular business models. The insights and stakeholder map developed in this first phase of work are instrumental guidelines, and will support the ventures in building into the overarching objective of the Circular Innovation Collective: to stimulate an innovation ecosystem that allows the higher R-innovations to overcome (financing) barriers to scale and thereby drive the textile value chain towards circularity.

Circular Innovation.
collective

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