READY

MDD4AT

Material Driven Design for Apparel & Textiles

READY

Innovationsfonden

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1.Introduction

This report is written in the context of READY, a research project supported by Innovation Fund Denmark, 2023-2026.
The purpose of READY is to develop knowledge that can support the textile industry in maturing recycled, virgin and/or local raw materials for scalable solutions within a circular economy system.
The ambition of READY is to contribute to the green transition by strengthening material-driven innovation and competitiveness in the textile industry (figure 1) .

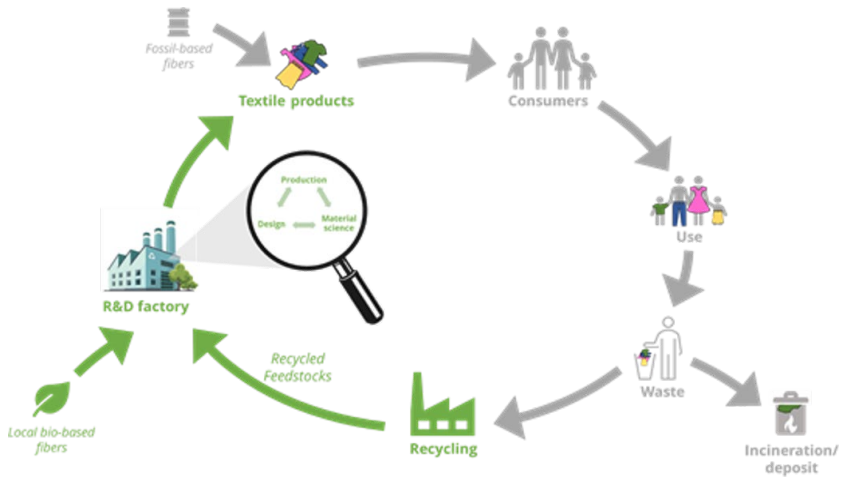


Figure 1: READY's position and focus area of the circular loop (green area)

1.1 Background

The planetary boundaries are currently being exceeded (Stockholm Resilience, 2023) and the clothing and textiles industries have a huge impact through massive extraction and use of mostly virgin resources. Combined with the EU Eco-design directive (European Commission, 2024), which promotes the use of more recycled materials and the design of longer lasting products, this demands new approaches to the design process of clothing and textiles.
READY aims for circularity focusing on maturing resources to re-enter a circular loop.

A main objective in the READY project is to develop new materials – fibres, yarns and fabrics – using post-consumer waste. These new recycled materials possess other functional and aesthetic properties than conventional materials. Consequently, recycled materials can be categorized as 'new or unknown' materials as properties are different from conventional 'known' materials.
Research shows that new materials can have an adoption phase of up to 20 years (Karana et al., 2015; Maine, 2005).
To contribute to a reduction of the long adoption phase, Karana et al. (2015) suggested a Material Driven Design Model, MDD (Figure 2). The model has not been developed specifically for clothing and/or textile materials nor is it specifically developed to contribute to the green transition of these industries.

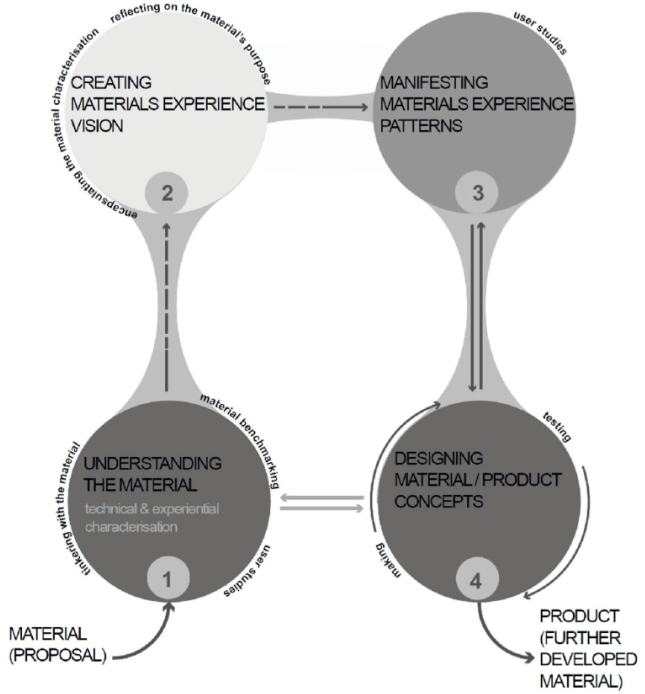


Figure 2.: MDD, material driven design (Karana et al, 2015)

2. Process and Methodology

The READY research team has tested the MDDmodel (Karana et al, 2015) in collaborative workshops and in consecutive iterations with industry partners. The purpose was to assess to which extent the model could contribute to a higher and faster acceptance of the newly developed materials from the READY project. The model, which offered a highly relevant approach, was however perceived as too complex and time-consuming by the project's industrial partners. Therefore, a number of iterations have investigated ways to treat the intake of known and unknown materials and resources in a way that is suitable for the clothing and textile industry (Figure 3 & 4).

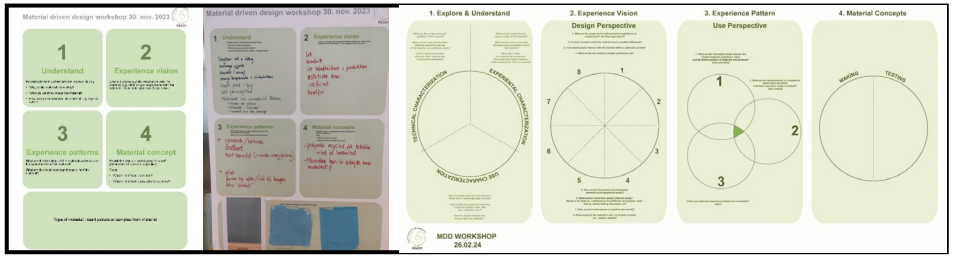


Figure 3: Left and middle: The first adapted version of the MDD model. Right: The second version of the MDD model (Bang et al., 2025).

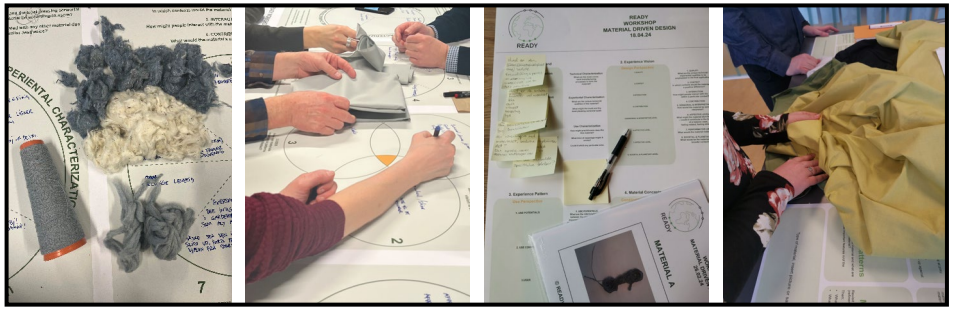


Figure 4: Co-creation workshop, evaluating materials (Bang et al., 2025).

Based on the insights and participant feedback from the model iterations, a first draft of a model aimed specifically at assessing materials for apparel and textile use was developed: Material Driven Design for Apparel & Textiles, MDD4AT (Figure 5).

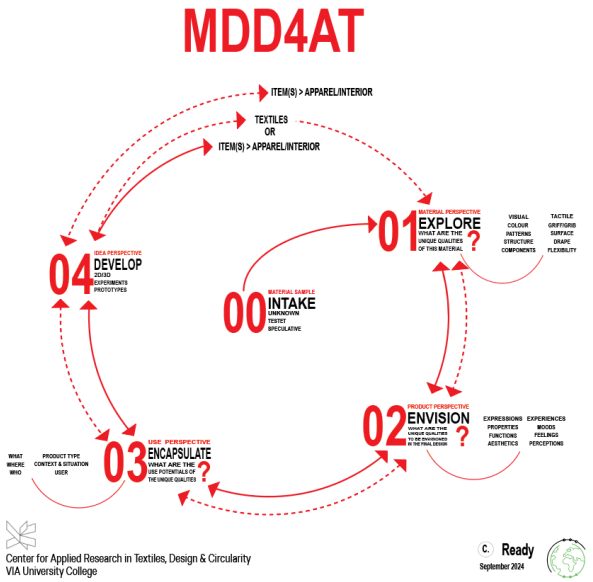


Figure 5: First draft of MDD4AT (Bang et al., 2025; Bang & Harsaae, 2025).

The MDD4AT model was developed in Autumn 2024. The aim with the model is to provide apparel and textile designers and development teams with an operation tool to let material resources inform the design process, product development and managerial decisions. An intake material can be on all development stages from idea to finished product, and may include fibre yarn, fabric, biomaterials, and products in different development stages. MDD4AT is intended to be used in the beginning of the design process by taking a starting point in known and/or unknown materials and available resources (Figure 5: 00 Intake). Thereafter, the exploration of the materials' unique qualities contributes to create an aesthetic and operational space for developing 2D textiles and/or 3D products. Using the material as starting point highlights the importance of 1) developing and/or adopting new materials (e.g., made from recycled materials, biomaterials) at a faster pace and/or 2) making use of available resources (deadstock, overproduction, etc.).

2.1 The MDD4AT model

The model includes three phases that explore (phase 01), envision (phase 02), and encapsulate (phase 03) the materials' unique qualities. This enables the designer to create an operational aesthetic space (Risberg, 2017; Folkmann, 2023) for the design phase and the development of prototypes (phase 04) (Bang & Harsaae, 2025).

2.2 The aesthetic operational space

Depending on context and brand, a design brief is traditionally focused on the desired product and therefore constituted by various factors including elements such as trends, brand DNA, customer segment, price and market. Thereby, the brief defines the aesthetic latitude or space (Riisberg, 2006; Leerberg et al., 2010; Folkmann, 2023) in which the designer can operate.

In 2006, Riisberg states that "designers always act within some boundaries or constraints which set the frame for the 'aesthetic latitude' at stake" (Riisberg, 2006:23). This latitude "defines the limits for the production of 'new' artistic expressions" (Ibid:73).

An approach that is further explored by Folkmann in 2023: "In brief, aesthetic dispositions describe the space of cultural, social, institutional, political, and economic factors that set the scene for what is regarded as aesthetic in a given context and that, in relation to designers, frame the space of aesthetic parameters to act within when designing" (Folkmann, 2023:157).

This definition opens for including known and/or unknown materials and available resources as an essential element in shaping the aesthetic space in which designers can operate. Furthermore, it draws attention to the current lack of balance between resource extraction and the health of the planet

2.3 Development and testing

The MDD4AT model has been tested, evaluated and adjusted by students and in workshops with industry and academic partners.

In December 2024, three students tested the MDD4AT model as part of their final BA project. Two textile students explored an existing stock of Spelsau wool yarn to investigate potentials for garment and accessory products and one fashion student explored a selection of deadstock fabrics as the main resource for the development of a fashion collection. The students gave valuable feedback on the use of the process model and concluded that it provided them with new perspectives on use and valuation of resources.
The fashion student tested MDD4AT on two selected deadstock materials and evaluated the process as having added new dimensions to her design process. The student expresses that the model assisted her in focusing not only on the materials' potentials but also on the limitations.

"I lost the connection to the material a bit, which comes from both a lack of experience, but also from a habit of just designing and then adapting the material to the design. I therefore chose to go back to the MDD4AT model, but this time with a different approach; What can't the materials do?"
(Fashion student)

One of the textile students experimented with the coarse Spelsau yarn on the knitting machines and specifically highlighted how the process of entering a dialogue with the material created deep learning.

"[...] only when I had acknowledged that it was neither me nor the knitting machine that was wrong, but simply the material trying to tell me what it could and could not do – did frustration turn into learning."
(Textile student)

However, the students also agreed that it had been challenging to address and evaluate the materials, because it was an unfamiliar way of working as opposed to a traditional design brief. They also noted that the model's concepts and approaches were complex.

Consequently, the model 'Sensorial Wheel' (Hartvigsen & Hasling, 2022) was tested as a supportive tool. The Sensorial Wheel is developed as a tool to evaluate existing textiles in relation to technical, aesthetic and functional aspects. This test was executed by two fashion design interns in spring 2025. The implementation of the Sensorial Wheel did reduce the complexity of the exploring phase (phase 01), and the interns supplemented the phase with lab-tests to further explore and establish material quality and functionality.

> *" Through MDD, I learned to listen to the properties, limitations, and expressions of each fabric, and to allow these to guide form, function, and narrative. [...] it profoundly reshaped the way I approach material and helped me to re-discover my own creative abilities."*
> *(Fashion student, intern)*

Further feedback from the two interns and from an interdisciplinary student workshop at the international CLIMATHON event in autumn 2025 pointed at complexity of the envision (phase 02) and encapsulating phases (phase 03).

The model has subsequently been further developed including additional supportive tools. Likewise, a new phase (phase 05) focusing on 'ensuring' addressing the relationship between the waste hierarchy and the developed prototypes has been added. The colourway of the model has also been changed to fit the READY colourway (Figure 6) .

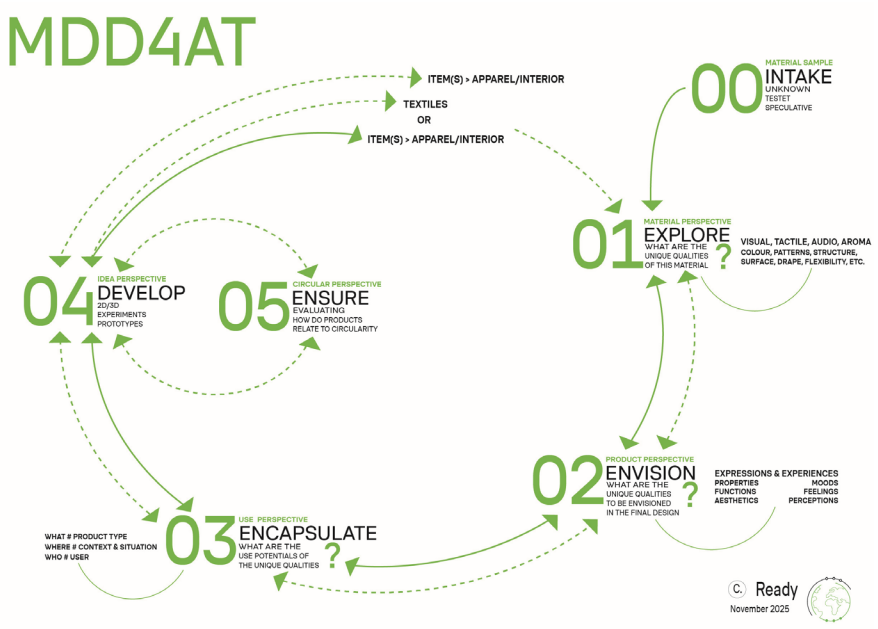


Figure 6: Second draft of MDD4AT. Developed by authors, November & December 2025.

The new version, developed in November and December 2025 is planned for testing in early Spring 2026.

Apart from the added Ensure phase, the new model is similar to the first version of the model.
It is basically an iterative process model that takes known and/or unknown materials and available resources as the starting point to highlight the importance of designing and implementing new materials at a faster pace and/or making use of available existing resources (deadstock, overproduction, etc.). The process can be repeated several times. If the point of departure is a yarn, which is turned into a knitted fabric, it is relevant to employ the model to investigate the yarn as well as the fabric.

3. Operating the MDD4AT Model

The idea with the MDD4AT model is to explore known and/or unknown materials and available resources in the initial phase of a design process aiming to contribute to reduce resource extraction. Thereby, MDD4AT provide apparel and textile designers with an operational tool, where material investigation and dialogues frame the aesthetic operational space and inform the creative design process and aesthetic and functional product development. The model investigates the intake (phase 00): a known and/or unknown material or an available resource from a material (phase 01), product (phase 02) and use (phase 03) perspective before idea generation, prototyping, evaluation and validation (phases 04 & 05).

This approach requires an open mindset to evaluate the resources without preconceived ideas or prejudices. It is important to remember that all resources has an origin and have been processed and thereby represent an environmental impact.

The MDD4AT consists of the visualization of the model (Figure 6), as well as supporting models, canvases, and tools that serves as guidelines for the investigations, notes and findings. The phases of the model is described in the following pages together with recommendations for supportive models and tools relating to the different phases.

At the end of the report, the model with the different canvases are attached as individual sheets that can be printed and used as a 'booklet' for workshops, project work or teaching (see page 8 -9). The supporting models and tools are similarly included in the report and can be printed in A4 or A3.

3.1 Intake (Phase 00)

The process is kick-started by an existing material or a material proposal. The project, course or design brief defines the relevant intake material.

The intake is defined as belonging to one of three scenarios as proposed by Karana et al. (2015:39).

Scenario 1: Designing with a relatively well-known material, to explore new application areas to evoke new meanings and to elicit unique user experiences. It could be deadstock.

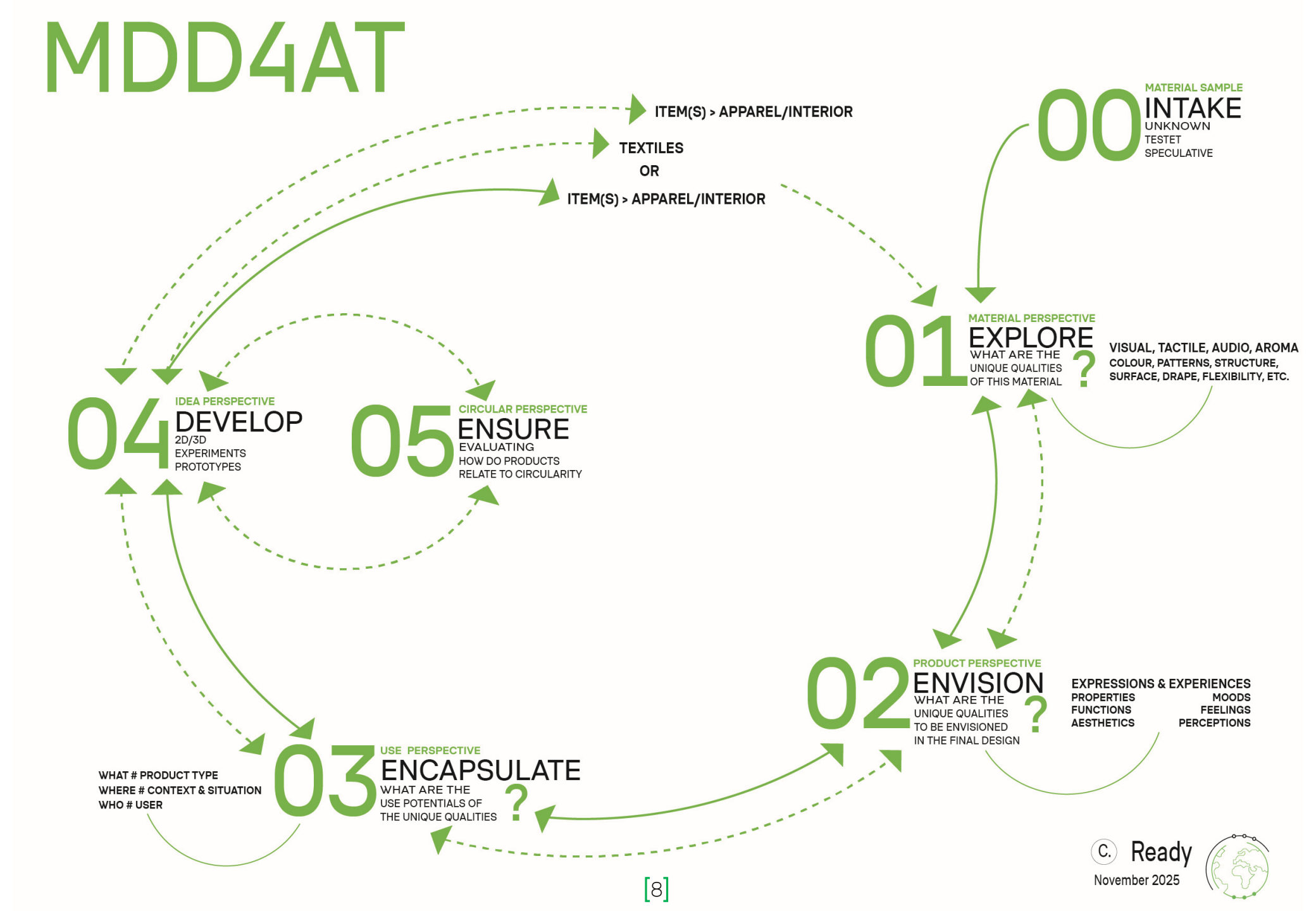
Scenario 2: Designing with a relatively unknown material. The material is unlikely to be linked to settled meanings, affording the designer opportunity to define application areas through which unique user experiences, identities for materials, and new meanings may be introduced. It could be 'new' materials such as hemp, bio leather and/or recycled materials at a high development stage.

Scenario 3:
Designing with a material proposal with semi-developed or exploratory samples. Since the material is semi-developed (i.e., proposal), its properties are to be further defined through the design process in relation to a selected application area, also to generate feedback for further materials development. Furthermore, since the material is novel, it is difficult to recognize and is in need of the designer to propose meaningful applications through which unique user experiences and meanings will be elicited. It could be bio-materials or recycled materials at a low development stage.

The process begins with an identification of the type of material. It can be based on the following characteristics:

- Origin – scenario and category
- Type – fibre, yarn, fabric, woven, non-woven, knitted, etc

MDD4AT



C. Ready
November 2025

00 INTAKE

UNKNOWN/
TESTED/
SPECULATIVE

MATERIAL

DEFINE

TYPE fibre, yarn, woven, non-woven, knitted, ...	ORIGIN recycled, deadstock, biomaterial, ...	IF TESTED

SCENARIO 1, 2, OR 3

Scenario 1: Designing with a relatively well-known material

Scenario 2: Designing with a relatively unknown material

Scenario 3: Designing with a material proposal with semi-developed or exploratory samples

MATERIAL PERSPECTIVE

01 EXPLORE

WHAT ARE THE UNIQUE AESTHETIC AND SENSORIAL QUALITIES OF THIS MATERIAL?

VISUAL

COLOR	STRUCTURE	SHEEN/GLOSS LEVEL
PATTERNS	TEXTURE	OTHER

TACTILE

GRIP/hand feel	SURFACE FEEL	WEIGHT
DRAPE	STRETCH	OTHER

MATERIAL PERSPECTIVE

01 EXPLORE

WHAT ARE THE UNIQUE AESTHETIC AND SENSORIAL QUALITIES OF THIS MATERIAL?

AUDIO + AROMA

SOUND	SMELL INTENSITY	SMELL ASSOCIATIONS

LAB TESTS MUST BE PLANNED ACCORDING TO THE INITIAL DEFINITION OF THE INTAKE MATERIAL (E.G., KNITTED VS. WOVEN). LAB TEST CAN INCLUDE:

COMPOSITION	ABRASION RESISTANCE	BURST STRENGTH
TEAR STRENGTH	PILLING	DIMENSIONAL STABILITY
TENSILE STRENGTH ON YARN	COLOURFASTNESS	OTHER

PRODUCT PERSPECTIVE

02 ENVISION

WHAT ARE THE UNIQUE QUALITIES TO BE ENVISIONED IN THE FINAL DESIGN?

EXPRESSIONS

PROPERTIES	AESTHETICS	OTHER
FUNCTIONS	ASSOCIATIONS	

EXPERIENCES

MOOD	PERCEPTIONS	OTHER
FEELINGS		

USER PERSPECTIVE

03 ENCAPSULATE

WHAT ARE THE USE POTENTIALS OF THE UNIQUE QUALITIES?

WHAT	WHERE	WHO
PRODUCT TYPE	CONTEXT AND SITUATION	USER

IDEA PERSPECTIVE

04 DEVELOP

2D/3D EXPERIMENTS
PROTOTYPES

PREVENT PERSPECTIVE

05 ENSURE

HOW TO ENSURE THE WASTE PREVENTION?

REFLECT

How have we ensured the product's longevity to prevent waste and keep it in first use phase for as long as possible?	How have we designed the product to allow for remanufacture or repurpose?
Are we providing care instructions that help extend the product's first use phase?	Have we ensured the product to be easily repaired, refurbished, or repurposed?
How have we designed the product to enable reuse?	Have we reflected on whether additional components are necessary? Can possible components (buttons, zippers) be easily removed for recycling?
How have we ensured that the product is easy to repair?	Have we considered the design's end of life to prevent it ending in landfill or incineration?

PREVENT PERSPECTIVE

05 ENSURE

HOW TO ENSURE THE WASTE PREVENTION?

Prevent	Prevent the creation of waste by avoiding the initial use of resources or by designing processes and products that minimise material input, choosing durable and efficient solutions, and reducing unnecessary consumption.
Reuse	Reuse by another consumer of a discarded product which is still in good condition and fulfils its original function.
Repair	Product is still in good condition and fulfils its original function. Repair and maintenance of defect product so it can be used with its original function.
Refurbish	Restore an old product and bring it up to date.
Remanufacture	Use parts of the discarded product in a new product with the same function.
Repurpose	Use discarded product or part of it in a new product with a different function.
Recycle	Any recovery operation by which waste materials are reprocessed into products, materials or substances, whether for the original or other purposes.
Disposal	E.g. landfill or incineration. Should always be avoided.

3.2 Explore (Phase 01)

The explore phase investigates the intake from a material perspective.
After the identification of the material, the next step focuses on exploring the characteristics and properties of the intake material. Start with exploring the aesthetic and sensorial characteristics of the material.

- What do you see, feel and experience?
- How does the material feel, smell, sound, look?

In this phase it is important to be curious, openminded, and not-judgemental in the exploration of the material. Focus is on the experiences related to the material and to explore the material as if it was the only possible material to use.

The sensorial wheel can be used to support the exploration.

3.2.1 The Sensorial Wheel

The sensorial wheel addresses six categories: colour, shape, sound, odour, tactility and texture. Some of the categories relate to a certain sense while others are a combination of senses, e.g., colour relates to our visual sense, while texture combines both the visual and touch senses (Hartvigsen & Hasling, 2022).
The sensorial wheel consists of multiple contrasting word pairs sorted in bipolar scales to assess each category (Figure 7). A material sample is placed at the centre of the model and explored using the bipolar scales. One can delete or add new word pairs to personalize the wheel and thus describe the textile of sensorial investigation as thoroughly as possible.

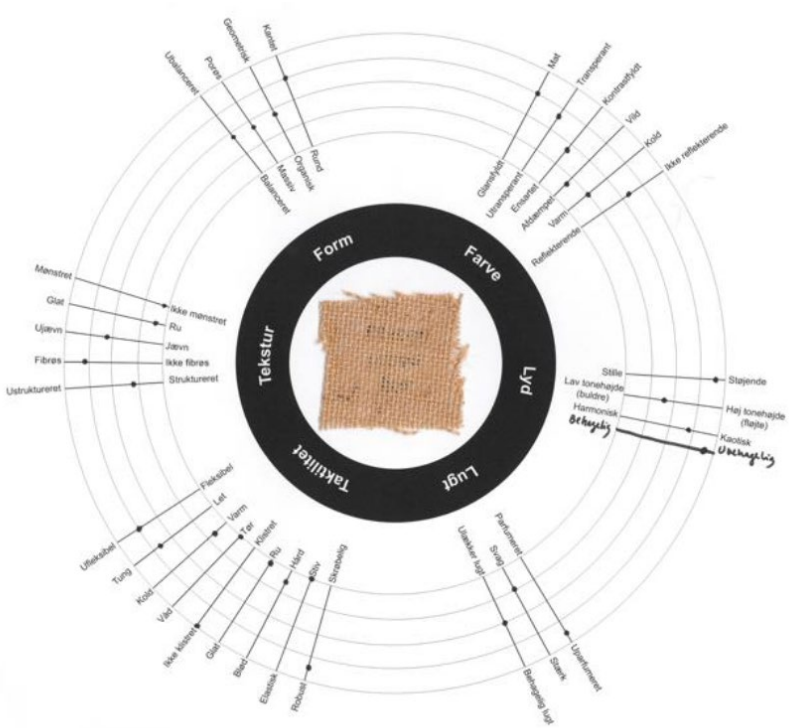


Figure 7: Example of using the sensorial wheel (Hartvigsen & Hasling, 2022).

The visual wheel is a continuation of the sensorial wheel (Figure 8). The first step is to choose one word from each of the six categories from the sensorial wheel and thereafter write it under the square assigned to each category. The next step is to illustrate the chosen words and to evaluate how well it fits to the initial design idea or concept.

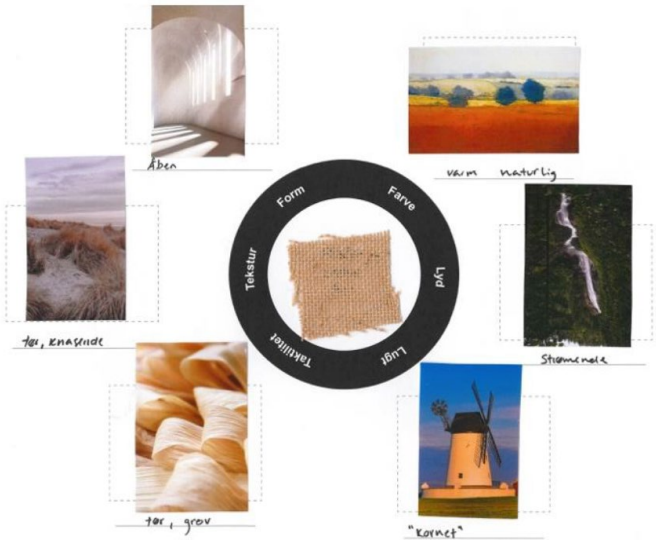


Figure 8: Examples of using the visual wheel (Hartvigsen & Hasling, 2022).

The sensorial wheel has an exploratory approach and thus supports the material perspective in the exploring phase (01) in MDD4AT, whereas the visual wheel has an analytical approach, based on a different entry point for the process. Consequently, the visual wheel is not implemented neither recommended as part of MDD4AT. However, the exploratory approach embedded in the sensorial wheel has inspired the development of the envision canvas supporting the envision phase (02) of MDD4AT (Figure 9).

3.2.2 Lab tests

Having explored the various sensorial and tactical properties of the intake material, it is recommendable to explore the material in lab to establish technical and functional properties as well.

Lab tests must be planned according to the initial definition of the intake material (e.g., knitted vs. woven). Lab tests can include:

- Pilling
- Abrasion resistance
- Colourfastness; (colourfastness to wash, colourfastness to sweat, colourfastness to rubbing, also known as crocking)
- Burst strength (Knitted fabrics)
- Tear strength (Woven fabrics)
- Tensile strength on yarn
- Composition
- Dimensional stability

Disclaimer

The list of laboratory tests only shows examples of potential tests and is by no means exhaustive. Lab tests must be planned and executed according to regulations and context demands.
Following phase 03, Encapsulate & phase 04, Develop it is recommended to re-evaluate if additional tests are needed.

3.3 Envision (Phase 02)

The envision phase investigates the chosen intake from a product perspective. This phase is about imagining and developing an experience vision of what the product intends to make a future user feel and do. The envision phase addresses two perspectives, expressions and experiences.

"The Materials Experience Vision expresses how a designer envisions a material's role in creating/contributing to functional superiority (performance) and a unique user experience when embodied in a product, as well as its purpose in relation to other products, people, and a broader context (i.e., society and planet)" (Karana et al,2015:42).

The envision phase focus on "[...] qualifying the material not only for what it is, but also for what it does (Manzini, 1986), what it expresses to us, what it elicits from us (Karana et al., 2014), and what it makes us do (Giaccardi & Karana, 2015)." (Karana et al, 2015:37).

The expression perspective investigates the properties, functions, and aesthetics of the material. The previous exploration in phase 01 focused on experiencing the sensorial aspects of the material. This perspective of the envision phase focus on analysing and interpreting the findings to organize them into the three areas by asking these questions:

- What properties does the material possess?
- What functions can the material contribute?
- What aesthetics can the material create?

The experience perspective is speculative as it is about envisioning the mood, feelings, and perceptions the material has the potential to create. It similarly addresses three aspects of experiences:

- What perceptions could the material foster?
- What feelings could the material raise?
- What mood could the material contribute to create?

3.3.1 Envision canvas

With inspiration from van Kesteren et al. (2007) and the sensorial wheel (Hartvigsen & Hasling, 2022) the Envision canvas has been created as a supportive tool. The canvas provides a variety of word pairs to stimulate thoughts, the word pairs are to be seen as inspiration and can be changed or replaced.

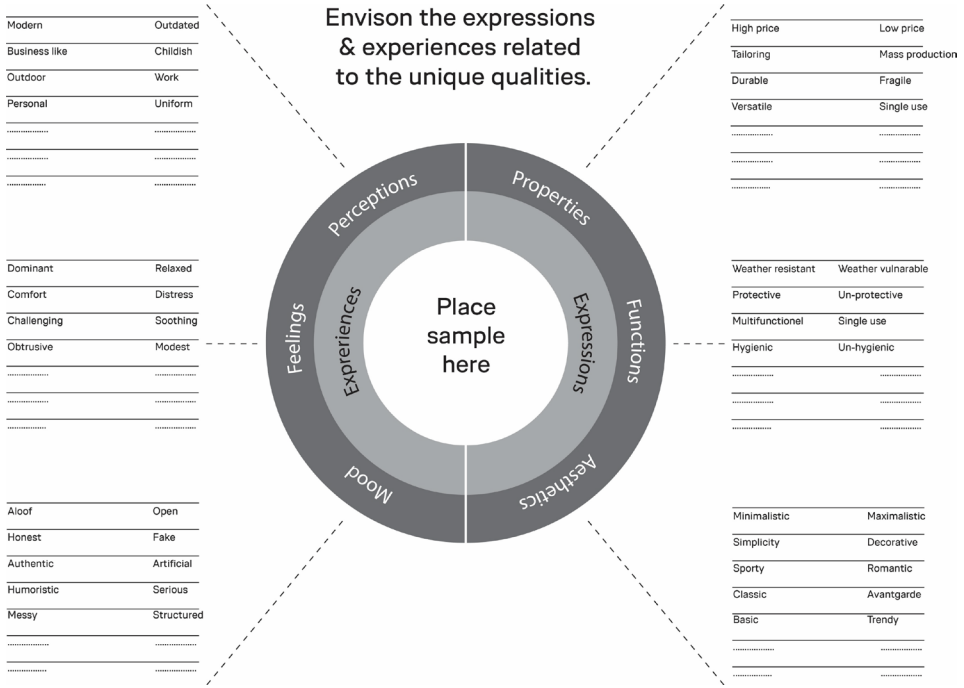


Figure 9: The Envision canvas, developed by authors, December 2025

3.4 Encapsulate (Phase 03)

The encapsulate phase explores the resource from a usage perspective. This phase focuses on the type of products the material can be used for, in what context and situation it might be relevant, and who the users might be.

The properties, characteristics and functions that has been identified in the 'exploring' and the 'envisioning' phases guides the type of products the material is suitable for. The identification can include an open perspective as product categories; e.g.. outerwear, performance wear, or upholstery for interior. It can also be more limited; e.g. summer dresses or lightweight curtains.

The product type or product categories will of course be indicative in determining the relevant context and situational use.

To identify the potential user, it is recommended to continue to work purely speculatively and analytically based on the material insight. It is possible to address the material properties and investigate to what extent specific materials have the potential to solve user challenges.
As a supporting tool, we suggest to employ the User Centric Model to obtain concrete data-based knowledge about users and their needs, challenges and desires (Figure 10). Employing the model requires additional data collection related to user preferences and use.

"The User Centric Model is data driven (qualitative and quantitative). It consists of four quadrants each addressing a set of characteristics. The overall insights from each of the quadrants form a coherent niche with specific preferences in relation to product performance. Basically, the model aims to identify the product performance requirements a specific group of individuals (a niche) desire". (Harsaae et al., 2025:29)

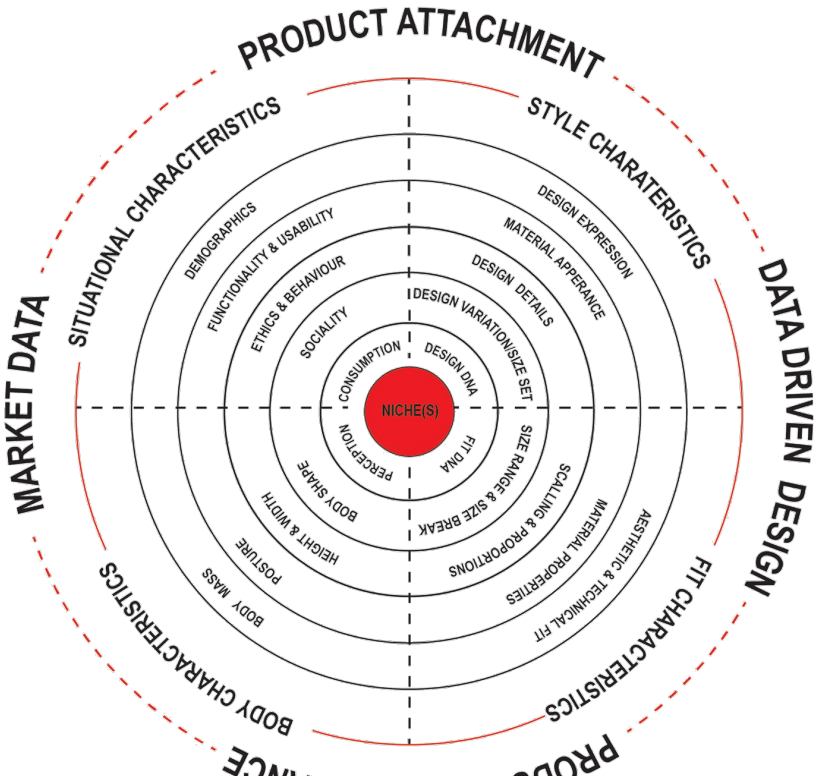


Figure 10: The User Centric Model, Harsaae et al, 2025

The model has been developed within the TRACE project Mass Customization for Circularity. In the related report the model is introduced and explained. The introduction is included at the end of this report.

3.5 Develop & Ensure (Phase 04 & 05)

Based on the previous phases, it is now possible to define the aesthetic operational space for idea generation and development. Use the space to develop new technical, functional, aesthetic and emotional material or product ideas.
In addition to the framework provided by the MDD4AT model, the idea generation must be related to the context of the project or task in question, also considering whether it is development for a specific brand or experimenting with new concepts. Developing for a specific brand may involve merging brand requirements and design DNA with the insights from the material-driven design process. This can add further potentials and/or constraints to the idea development. However, the material insights obtained through the MDD4AT process may simultaneously posses the potential to challenge brand requirements and/or design DNA.

While developing the idea(s), it is suggested to continually ensure how the ideas correspond to the waste hierarchy and where the products might be placed. It is important to remember to aim for designing products that can be placed as high as possible in the hierarchy. The waste hierarchy in Figure 11 is developed based on the EU-waste hierarchy

4. Closing remarks

Since the outsourcing of products in the last decades of the 20th century, our relationship with resources has become increasingly distant and superficial. The intensive work of growing, extracting, harvesting and processing the materials needed to design, produce and consume textile products has become almost invisible.

The intention with the MDD4AT model is to contribute to a greater awareness of and new perspectives on known and unknown materials and available resources.

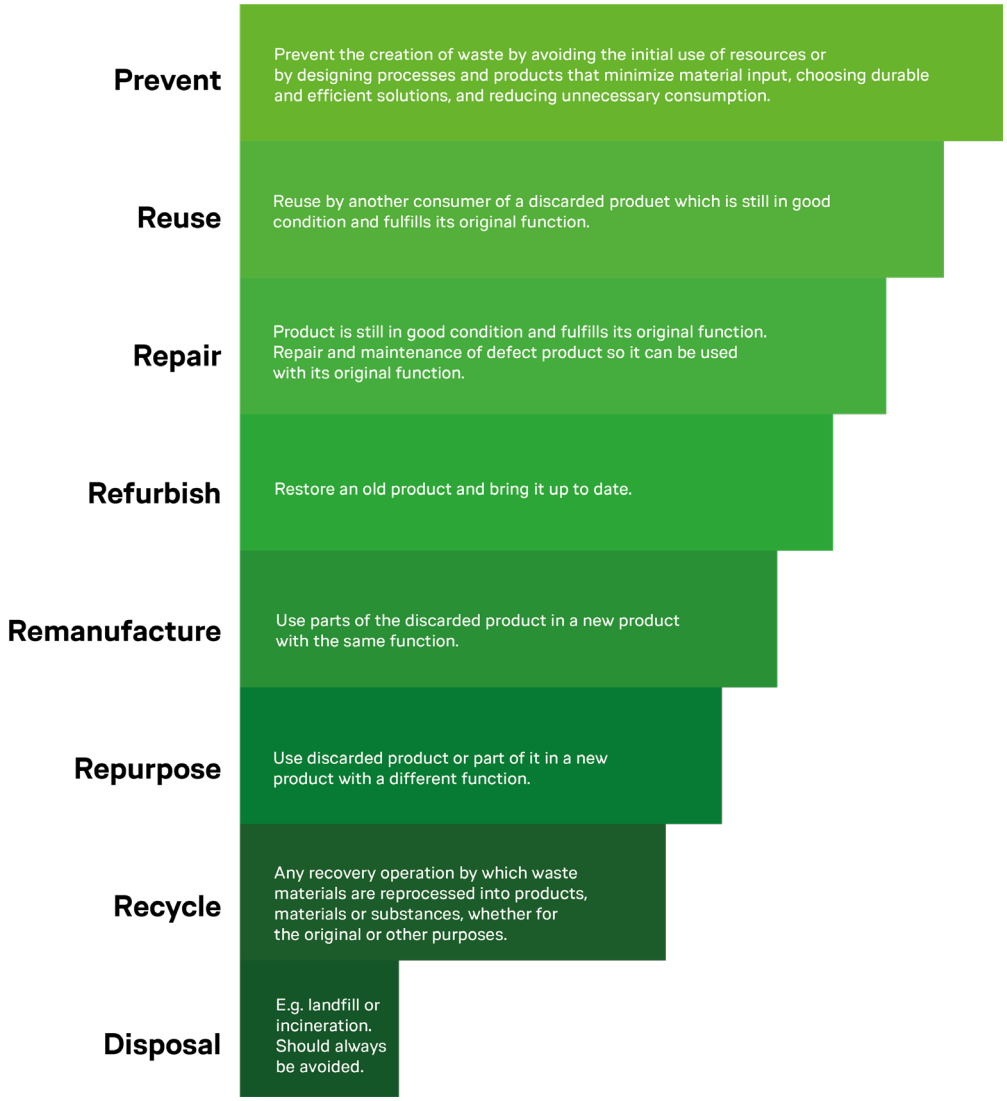


Figure 11: Waste hierarchy, developed by authors inspired by EU waste hierarchy, December 2025.

5. References:

Bang, A. L.; Harsaae, M. P.; Nyvang, L.; Mikkelsen, X.; Andersen, K. R.; Ricard, L. M. (2025) Material Driven Design for Apparel and Textile Products. DS 137: Proceedings of the International Conference on Engineering and Product Design Education. (E&PDE 2025)
https://www.designsociety.org/publication/48618/material_driven_design_for_apparel_and_textile_products

Bang, A. L.; Harsaae, M. P. (2025) Material Driven Design for Creative Material Dialogues. Biennial International Conference for the Craft Sciences. Version 1.
https://biccs.dh.gu.se/2025/2025-02/1

European Commision (2024). Ecodesign for Sustainable Products Regulation. https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/ecodesign-sustainable-products-regulation_en#documents-and-links

Folkmann, M. (2023). Design Aesthetics. Theoretical Basics and Studies in Implication. The MIT Press.

Harsaae, M.P., Pedersen, L., Terkildsen, M.N., Bang, A.L. (2025) Mass Customization for Circularity, Project report https://trace.dk/media/3vwf5wma/mcc-afrapportering-250425.pdf

Hartvigsen, M. L. & Hasling, K. M. (2022). Exploring Sensuous Qualities of Textiles. Proceedings from the International Conference on Engineering and Product Design Education (E&PDE 2022)
https://www.designsociety.org/publication/45806/exploring_sensuous_qualities_of_textiles

Karana, E., Barati, B., Rognoli, V., & Zeeuw van der Laan, A. (2015). Material driven design (MDD): A method to design for material experiences. In: *International Journal of Design, 9(2), 35-54*.

Leerberg, M., Riisberg, V. & Boutrup, J. (2010). Design Responsibility and Sustainable Design as Reflective Practice: An Educational Challenge. Sustainable Development, 18, 306–317. Wiley Online Library.

Maine, E., Probert, D., & Ashby, M. (2005). Investing in new materials: A tool for technology managers. In: *Technovation, 25(1), 15-23.*

Riisberg, V. (2006). *Design og produktion af trykte textiler- fra analoge til digitale processer*. Ph.d. dissertation, Design School Kolding

Stockholm Resilience (2023) https://www.stockholmresilience.org/research/planetary-boundaries.html Accessed 12.11.2025

van Kesteren, I. E. H., Stappers, P. J., & de Bruijn, J. C. M. (2007). Materials in product selection: Tools for including user-interaction aspects in materials selection. International Journal of Design, 1(3), 41-55

Waste hierarchy: https://eur-lex.europa.eu/EN/legal-content/glossary/waste-hierarchy.html

Appendix

On the following pages you will first find the 4 pages that can be printed and assembled into a booklet The layout of the pages have been constructed to create the booklet (pages 18 – 21).

If you prefer to print the canvases separately, you will find these on the following pages.
(pages 23- 30)

Then follow the various canvases that can be used as support tools in working with the model.

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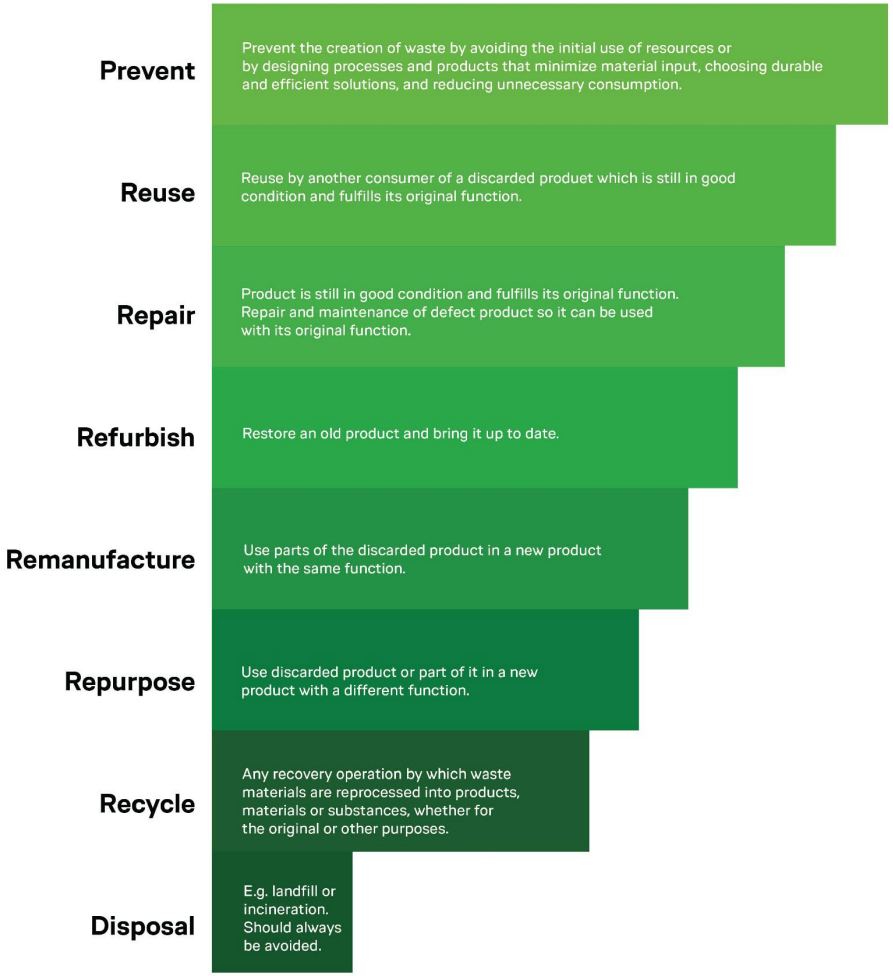
PAGES FOR BOOKLET MDD4AT

PREVENT PERSPECTIVE

05 ENSURE

Bring ideas to life
VIA University College

HOW TO ENSURE THE WASTE PREVENTION?



Bring ideas to life
VIA University College

00 INTAKE

UNKNOWN/
TESTED/
SPECULATIVE

MATERIAL

DEFINE

TYPE	ORIGIN	IF TESTED
fibre, yarn, woven, non-woven, knitted, ...	recycled, deadstock, biomaterial, ...	

SCENARIO 1, 2, OR 3

Scenario 1: Designing with a relatively well-known material

Scenario 2: Designing with a relatively unknown material

Scenario 3: Designing with a material proposal with semi-developed or exploratory samples

MATERIAL PERSPECTIVE

01 EXPLORE

Bring ideas to life
VIA University College

WHAT ARE THE UNIQUE AESTHETIC AND SENSORIAL QUALITIES OF THIS MATERIAL?

VISUAL

COLOR	STRUCTURE	SHEEN/GLOSS LEVEL
PATTERNS	TEXTURE	OTHER

TACTILE

GRIP/hand feel	SURFACE FEEL	WEIGHT
DRAPE	STRETCH	OTHER

PREVENT PERSPECTIVE

05 ENSURE

Bring ideas to life
VIA University College

HOW TO ENSURE THE WASTE PREVENTION?

REFLECT

How have we ensured the product's longevity to prevent waste and keep it in first use phase for as long as possible?	How have we designed the product to allow for remanufacture or repurpose?
Are we providing care instructions that help extend the product's first use phase?	Have we ensured the product to be easily repaired, refurbished, or repurposed?
How have we designed the product to enable reuse?	Have we reflected on whether additional components are necessary? Can possible components (buttons, zippers) be easily removed for recycling?
How have we ensured that the product is easy to repair?	Have we considered the design's end of life to prevent it ending in landfill or incineration?

IDEA PERSPECTIVE

04 DEVELOP

Bring ideas to life
VIA University College

2D/3D EXPERIMENTS
PROTOTYPES

MATERIAL PERSPECTIVE

01 EXPLORE

Bring ideas to life
VIA University College

WHAT ARE THE UNIQUE AESTHETIC AND
SENSORIAL QUALITIES OF THIS MATERIAL?

AUDIO + AROMA

SOUND	SMELL INTENSITY	SMELL ASSOCIATIONS

LAB TESTS

MUST BE PLANNED ACCORDING TO THE INITIAL DEFINITION OF
THE INTAKE MATERIAL (E.G., KNITTED VS. WOVEN). LAB TEST CAN INCLUDE:

COMPOSITION	ABRASION RESISTANCE	BURST STRENGTH
TEAR STRENGTH	PILLING	DIMENSIONAL STABILITY
TENSILE STRENGTH ON YARN	COLOURFASTNESS	OTHER

PRODUCT PERSPECTIVE

02 ENVISION

Bring ideas to life
VIA University College

WHAT ARE THE UNIQUE QUALITIES TO BE ENVISIONED IN THE FINAL DESIGN?

EXPRESSIONS

PROPERTIES	AESTHETICS	OTHER
FUNCTIONS	ASSOCIATIONS	

EXPERIENCES

MOOD	PERCEPTIONS	OTHER
FEELINGS		

USER PERSPECTIVE

03 ENCAPSULATE

Bring ideas to life
VIA University College

WHAT ARE THE USE POTENTIALS OF THE UNIQUE QUALITIES?

WHAT	WHERE	WHO
PRODUCT TYPE	CONTEXT AND SITUATION	USER

SEPERATE CANVASES MDD4AT

Bring ideas to life
VIA University College

00 !NTAKE

UNKNOWN/
TESTED/
SPECULATIVE

MATERIAL

DEFINE

TYPE fibre, yarn, woven, non-woven, knitted, ...	ORIGIN recycled, deadstock, biomaterial, ...	IF TESTED

SCENARIO 1, 2, OR 3

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Scenario 2: Designing with a relatively unknown material

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MATERIAL PERSPECTIVE

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PATTERNS	TEXTURE	OTHER

TACTILE

GRIP/hand feel	SURFACE FEEL	WEIGHT
DRAPE	STRETCH	OTHER

MATERIAL PERSPECTIVE

01 EXPLORE

Bring ideas to life
VIA University College

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AUDIO + AROMA

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MOOD	PERCEPTIONS	OTHER
FEELINGS		

USER PERSPECTIVE

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Bring ideas to life
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OF THE UNIQUE QUALITIES?

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WHERE

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PRODUCT TYPE	CONTEXT AND SITUATION	USER

IDEA PERSPECTIVE

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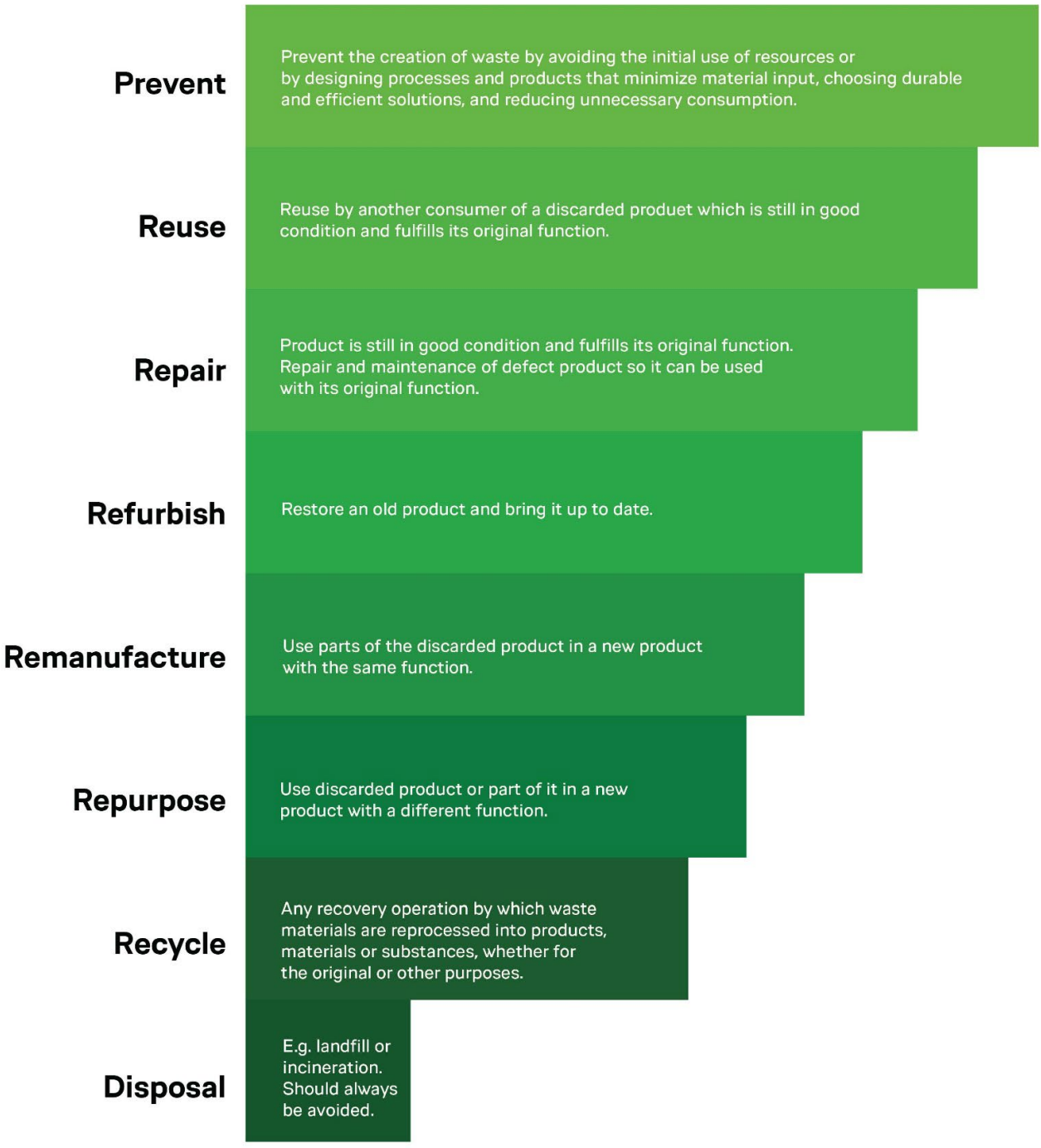
PREVENT PERSPECTIVE

05 ENSURE

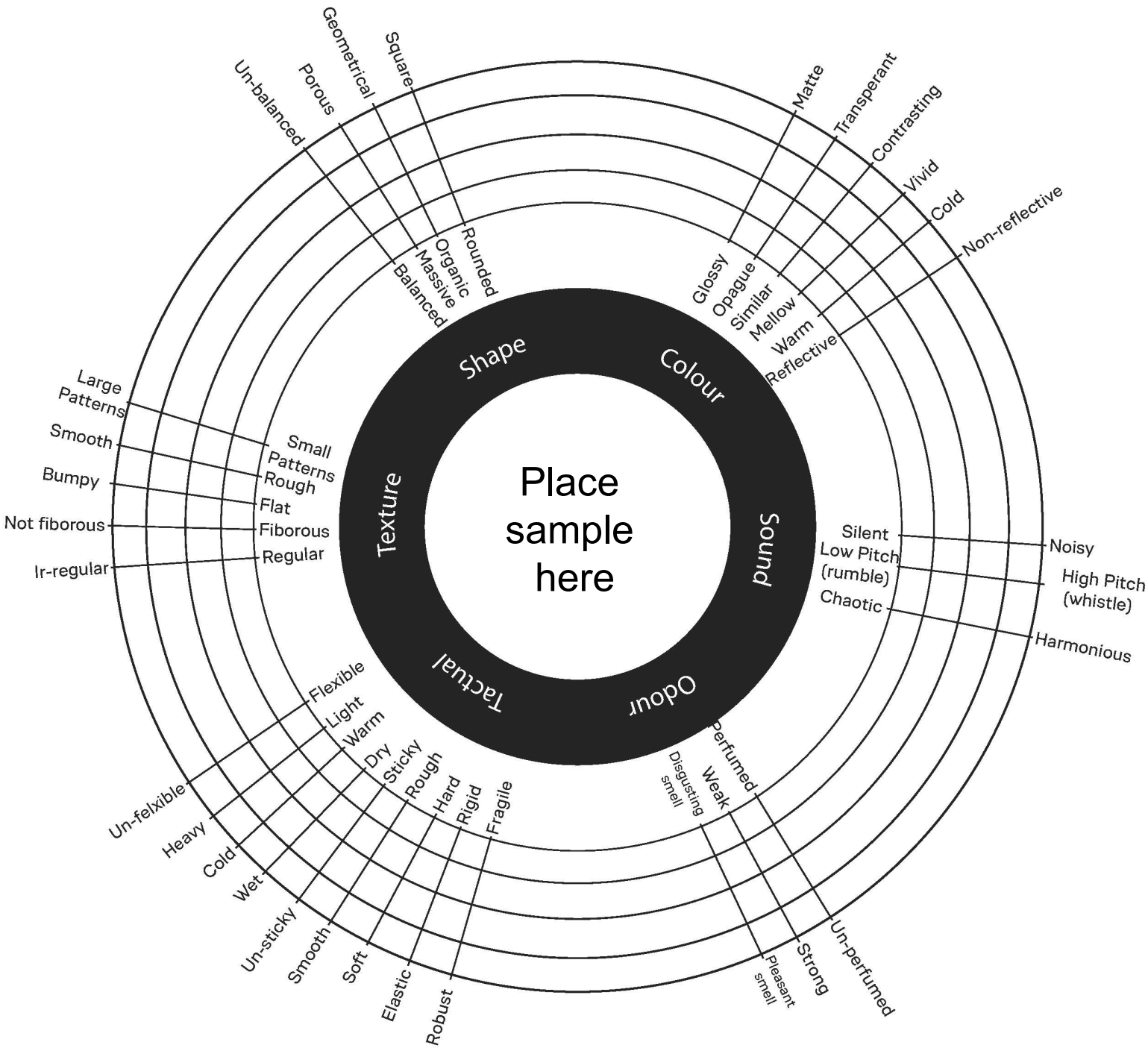
Bring ideas to life
VIA University College

HOW TO ENSURE THE WASTE PREVENTION?

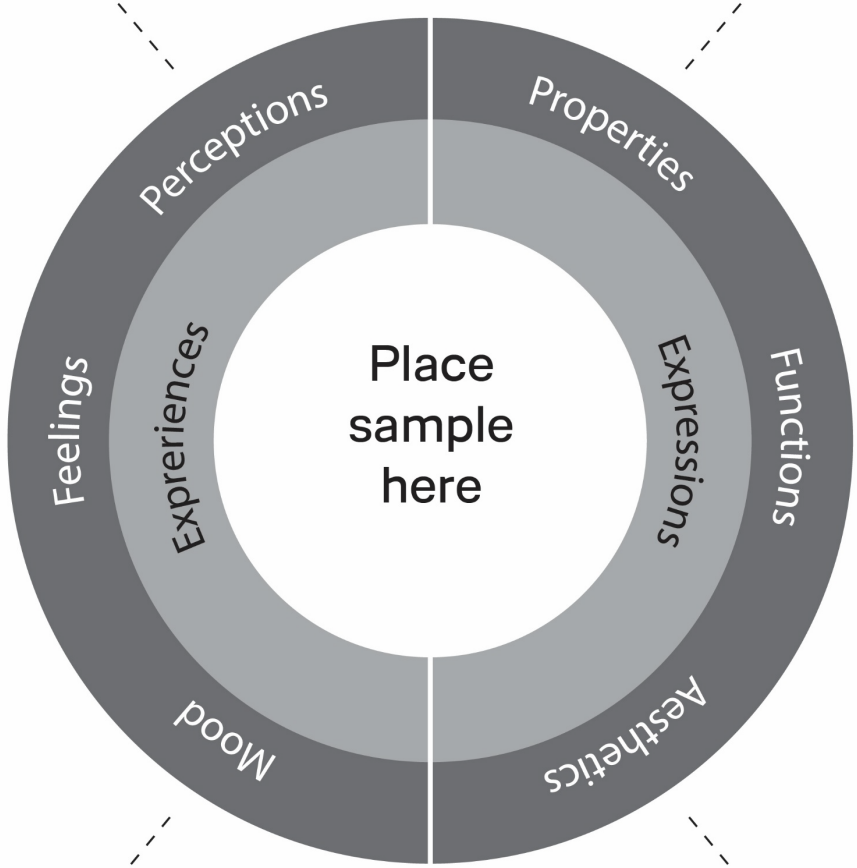


SUPPORTING MODELS

SENSORIAL WHEEL
ENVISION CANVAS
USER CENTRIC MODEL


Place sample here
Shape
Colour
Sound
Odour
Tactual
Texture
Un-balanced
Porous
Geometrical
Square
Rounded
Organic
Massive
Balanced
Matte
Transperant
Contrasting
Vivid
Cold
Non-reflective
Glossy
Opague
Similar
Mellow
Warm
Reflective
Large Patterns
Smooth
Bumpy
Not fiborous
Ir-regular
Small Patterns
Rough
Flat
Fiborous
Regular
Silent
Low Pitch (rumble)
Chaotic
Noisy
High Pitch (whistle)
Harmonious
Flexible
Light
Warm
Dry
Sticky
Rough
Hard
Rigid
Fragile
Un-felxible
Heavy
Cold
Wet
Un-sticky
Smooth
Soft
Elastic
Robust
Perfumed
Disgusting smell
Weak
Strong
Pleasant smell
Un-perfumed

Envison the expressions & experiences related to the unique qualities.



Modern	Outdated
Business like	Childish
Outdoor	Work
Personal	Uniform
.....	.....
.....	.....
.....	.....

High price	Low price
Tailoring	Mass production
Durable	Fragile
Versatile	Single use
.....	.....
.....	.....
.....	.....

Dominant	Relaxed
Comfort	Distress
Challenging	Soothing
Obtrusive	Modest
.....	.....
.....	.....
.....	.....

Weather resistant	Weather vulnarable
Protective	Un-protective
Multifunctionel	Single use
Hygienic	Un-hygienic
.....	.....
.....	.....
.....	.....

Aloof	Open
Honest	Fake
Authentic	Artificial
Humoristic	Serious
Messy	Structured
.....	.....
.....	.....

Minimalistic	Maximalistic
Simplicity	Decorative
Sporty	Romantic
Classic	Avantgarde
Basic	Trendy
.....	.....
.....	.....


PRODUCT ATTACHMENT
STYLE CHARATERISTICS
DATA DRIVEN DESIGN
FIT CHARACTERISTICS
PRODUCT PERFORMANCE
BODY CHARACTERISTICS
MARKET DATA
SITUATIONAL CHARACTERISTICS
DEMOGRAPHICS
FUNCTIONALITY & USABILITY
ETHICS & BEHAVIOUR
SOCIALITY
CONSUMPTION
PERCEPTION
BODY SHAPE
HEIGHT & WIDTH
POSTURE
BODY MASS
DESIGN EXPRESSION
MATERIAL APPERANCE
DESIGN DETAILS
DESIGN VARIATION/SIZE SET
DESIGN DNA
FIT DNA
SIZE RANGE & SIZE BREAK
SCALLING & PROPORTIONS
MATERIAL PROPERTIES
AESTHETIC & TECHNICAL FIT
NICHE(S)

USER CENTRIC MODEL

INTRODUCTION

(Report: https://trace.dk/media/3vwf5wma/mcc-afrapportering-250425.pdf)

5. 1 USER CENTRIC MODEL

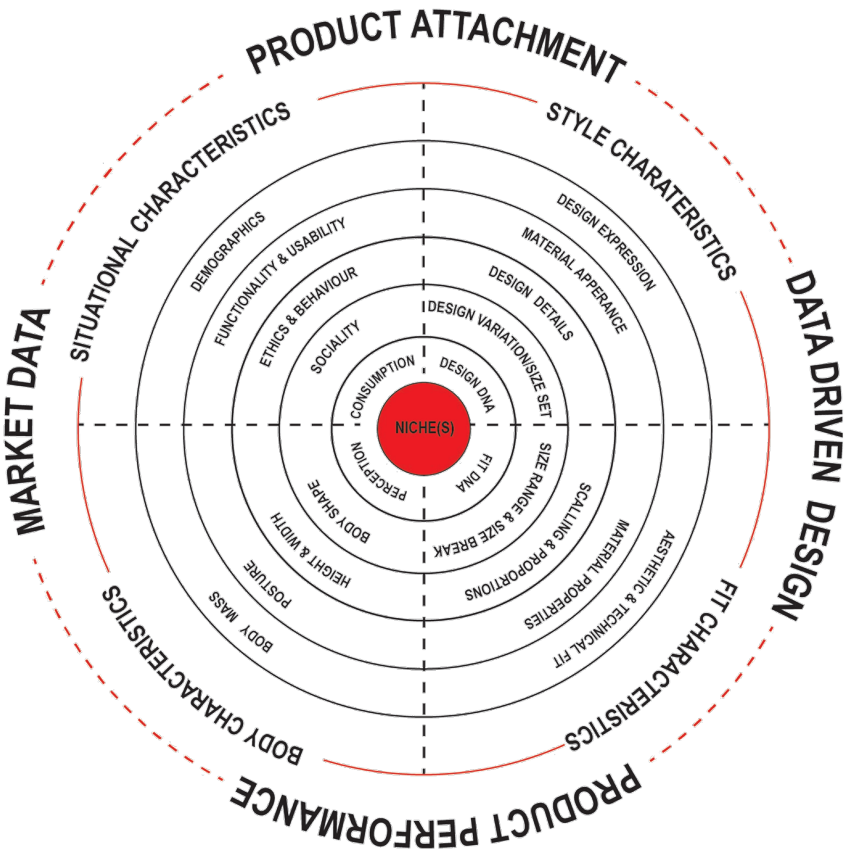


Figure 16. User Centric Model; Harsaae, Pedersen & Terkildsen, MCC Fashion 2024

5.1.1 INTRODUCTION

As the name indicates, the 'User Centric Model' (UCM) is a user centered approach focusing on solving user challenges related to (fashion) apparel.

The aim with the model is to provide a tool that create targeted niches. In the context of this project, a niche is defined as an extended version of a traditional target group. In the niche version we factor in a body profile based on anthropometric data. Meaning that we still work standardized but address several micro standards concurrently.
In a traditional mass market context, products are designed using an inside-out approach, primarily driven by trends, standard fit , and sizing. In contrast, the user-centric model emphasizes an outside-in approach, where user driven data plays a key role in informing decisions throughout the product development process to ensure a "product to consumer match" . The information generated from the model clarifies pains and gain and thus contribute to identify market potentials, support the development of collection strategies and business models, including inclusive fashion and establishing mass-customization set-ups.

The User Centric Model is data driven (qualitative and quantitative). It consists of four quadrants each addressing a set of characteristics. The overall insights from each of the quadrant form a coherent niche with specific preferences in relation to product performance. Basically, the model aims to identify the product performance requirements a specific group of individuals (a niche) desire.
Note: The model helps identify market gaps and potential opportunities for new products, but it is essential to confirm there is actual demand within these gaps. Data must validate whether a viable market exists

The data flow model serves the purpose of ensuring that product information is effectively communicated to potential customers, helping them make informed decisions. The model is elaborated on page 38.

5.1.2. SITUATIONAL CHARACTERISTICS

Situational characteristics relate to the context(s) surrounding users and the interaction with products from a functionality as well as from an identity aspect. User behaviour is influenced by lifestyle and norms in society expecting products to work in many different situations in their lives. Physical/non-physical work, events and interests as well as personal achievement create expectations for the clothing they prefer to engage with.

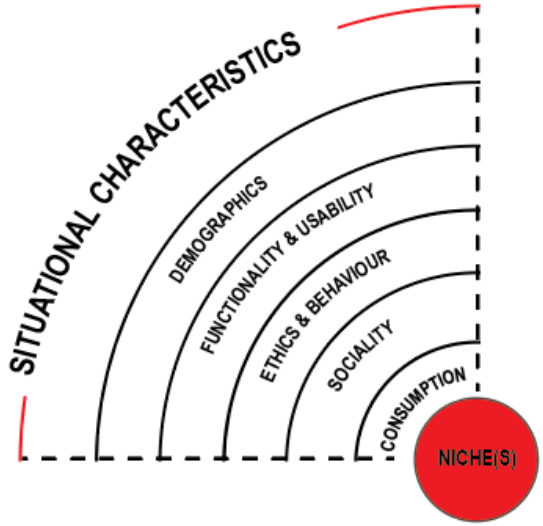


Figure 17: User Centric Model; Situational Characteristics, MCC Fashion 2024

DEMOGRAPHICS

Research establishing the demographics of any niche needs to be based on the use of empirical data to establish the foundation for real customer profiles. Statistics and quantitative surveys can be used to obtain basic information including age, gender, ethnicity, nationality, civil status, educational background, occupation, income, place of residence, and allocated budget for shopping clothes.

FUNCTIONALITY & USABILITY

Research on users' needs for functionality must serve to identify and understand the actual performance needed from the garments and the context of use. Including everyday wear, work/office wear, leisurewear, sportswear, underwear, home wear, special occasion dressing etc.

Usability refers to the ease with which users can interact with a product or system to achieve their intended goals. In the context of clothing and design, usability focuses on how well a garment functions for the wearer in terms of comfort, practicality, and ease of use. Clothing usability encompasses a variety of factors that contribute to how well the design supports the wearer’s needs, lifestyle, and activities. Usability focuses equally on functionality and aesthetic appeal. People tend to prefer clothing that aligns with their personal style and makes them feel good. If a garment is not visually appealing, it might not be worn as frequently, even if it’s functional. Thus, good usability in design involves balancing both functionality and aesthetics.

Clothing that requires extensive care or is easily damaged through regular wear and washing will have lower usability. Simple, easy-to-clean, and durable fabrics are key considerations in garment design. Garments that maintain their shape, color, and functionality after frequent use are more user-friendly.

One of the most critical aspects of usability in clothing design is fit. Garments must be well-fitted to provide comfort and freedom of movement. Usability is directly linked to how the clothing fits the body, offering the right amount of room, flexibility, and support. A poorly fitted garment can hinder mobility, cause discomfort, or require frequent adjustments, which decreases usability.

ETHICS & BEHAVIOUR

The ethical and behavioral aspects include identifying the users' attitudes, ideologies, principles, and beliefs. Identifying to which extend certifications, fair trade, children's labour, transparent communication, etc. are a determining factor for a purchase. Decoding how the intangible values, the values that goes beyond the functionality and usability, contribute to convince the users whether this product is worth possessing.

SOCIALITY

Adresses the users' belongings and the communities they are part of or aspire to belong to. Understanding what motivates them in their personal expression and the dress codes that makes them either blend in socially or are they dressing to stand out from the norms.

To which extend does informal and formal norms impact the users' dress decisions. Factors including age, gender diversity, and body type/size are often submitted to exclusion or inclusion through informal norms related to dress codes. Sociality relates to identity creation and the way in which we want to be perceived by others in a fashion context.

CONSUMPTION

Consumption relates to the motivation for shopping and to understand the individual needs, the functional and aesthetic preferences of the users. It is important to identify what drives the users' choices when shopping for their wardrobe. Are the users driven by trends, appearance, recognition, quality level, longevity, price, recommendations from trusted people or from SoMe channels. Understanding their favourite product categories are also essential knowledge for any brand to make user involved collection planning. Ideal behaviour (what is said) can collide with factual behaviour (what is done).

5.1.3. STYLE CHARACTERISTICS

Style characteristics relate to the users' preferences in relation to aesthetics and style.

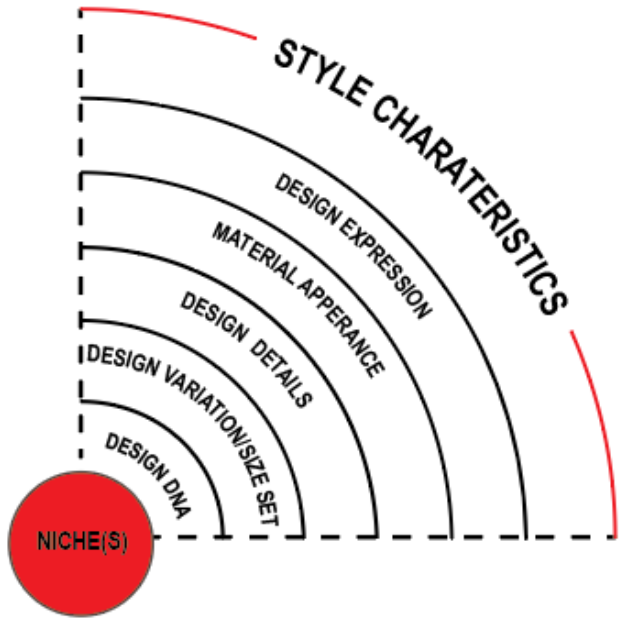


Figure 18: User Centric Model; Style Characteristics, MCC Fashion 2024

DESIGN EXPRESSION

Design expression constitutes the style that aligns the brands and users' preferences, including style concepts like streetwear, formal wear, casual wear, avantgarde, bohemian, sporty, feminine, classic, minimalistic, maximalistic, eclectic etc. Elements such as silhouettes, use of proportions in each garment, scale of design details (small, moderate, large) and the use of line flow to achieve a geometrical or organic expression. Expressions such as sculptural, layering, draping, deconstruction, etc can underline a design expression.

MATERIAL APPEARANCE

Addresses preferences related to the sensorial and functional experiences the material provides, how the user experience the interaction between body and material (comfort, softness, roughness, stretchability, resistance). It is about the expression, appearance, and tactility of the materials. It is about assessing the various aspects that, as a coherent whole, contribute to establish the design expression and appearance in relation to the material. It includes identifying the visual and tactual preferences for textures and surfaces (smooth, rough, shiny, smooth, even, uneven), colours (neutral, strong, pastel, dark, light), uni-coloured vs. multi-coloured, print (print or non-print) print types, (organic, graphic, romantic, minimalist), drape (touch, feel, textures). It also includes the users' preferences for specific fibres (natural or manmade, pure or blended) and their penchant for stretch.

DESIGN DETAILS

Addresses preferences related to the extend and expression of design details, from maximalism to minimalism. It relates to proportions (volume, length, width), pockets; sizes and functionality (usable, decorative), collars and hoods (types and sizes), cuffs (types and sizes), button placements, closures, stiches (type, colours, minimal use, decorative), etc.
It addresses preferences related to the use and expression of the trimming effects. The use of trimming adds to the overall expression of a product and relates to preferences for functional and decorative trim. Preferences for material choices are similarly important, metal (iron, silver, gold, brass, etc.), wood (light, dark), rubber (dark colours, neon, etc.). Decorative trim can comprise a variety of directions; romantic, boho, goth. sporty, and relate to use of tapes, badges, embroideries, buttons, rivets, zippers, buckles, sequins, rhinestones, studs, etc.

DESIGN VARIATIONS/ SIZE SETS

Design variations cover the different shapes, cuts, scaling of details, and line placements required to accommodate different body-types and sizes. It requires a critical stance and an acknowledgement that to achieve an intended design expression, each design element must be evaluated and qualified according to the body types and size sets the brand intends to cater to. Design critique is an important approach to ensure that the styles are suitable, not only in the base size, but also in the outer sizes the brand chooses to include. The identification of the necessary design variations is a fundamental approach to prepare for mass customization and inclusive collection strategies.

DESIGN DNA

A design DNA includes the design elements that are an inherent part of a brands aesthetic design strategy and the tangible/intangible elements that differentiates brands from each other and supports the visual identity. A Design DNA can embrace one or more style expressions, and this may be based in the situational usage of the products to cater for different needs of dressing (work, spare time, special occasions etc.). Observing how customers interact with a brands products will offer valuable insights on qualifying how users create attachment with the brands products to support their style preferences.

5.1.4 FIT CHARACTERISTICS

'[Fit is defined as] the ability to be the right shape and size' according to The Oxford Dictionary. A "clothing fit DNA" refers to the unique set of characteristics, measurements, and proportions that define how a particular brand or line of clothing is tailored to fit the human body. Much like genetic DNA determines the unique physical characteristics of an individual, a clothing fit DNA determines how garments are designed to fit and flatter different body types.

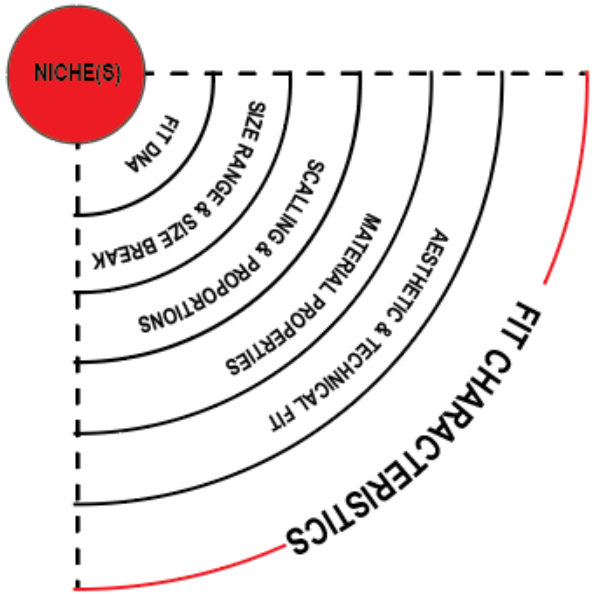


Figure 19: User Centric Model; Fit Characteristics, MCC Fashion 2024

A product's fit characteristics are determined by three key elements: size, shape, and proportions. Size is based on the body measurements of an individual. Body shape is influenced by the depth, width, and length of the body.

The third element, proportion, refers to the relationship between key body measurements, such as the chest and waist or the waist and hips, which must maintain a consistent ratio. A proportionate body means that these key body measurements are in harmony with each other, ensuring the garment fits well and complements the natural shape of the body. However, determining clothing fit goes beyond the range of any one profession; it is as much a design issue as it is pattern engineering. A garment represents a system composed of sub-systems (design, fit, size and engineering systems). However, a garment quality, design and fit can only be experienced and evaluated by its behaviour/performance when interacting with the wearer. Fit is a relational term; It depends on the form it relates to (here, the natural body). Thus, different body shape and sizes experience and present clothing designs and fit differently.
In contrast, a garment's size can be evaluated based on measurements to assess whether the intended size is achieved.

AESTHETIC & TECHNICAL FIT

Clothing fit can be divided into two main areas: **Aesthetic fit and technical fit.** Aesthetic fit focuses on how a garment looks on the body, rather than just how it fits in terms of size and measurement. It is deeply intertwined with a company's design DNA and the broader fashion context in which it operates. Aesthetic fit reflects the visual identity and unique design philosophy of a brand, while responding to current trends, cultural shifts, and consumer expectations. It involves several factors that influence the overall appearance of the garment, aligning it with the wearer's body shape, style preferences, and societal standards of beauty. Aesthetic fit goes beyond technical measurements, aiming to create a visual harmony that resonates with the wearer's body shape. In relation to size and scaling, it also refers to a flattering fit across a size range.

Technical fit covers the theory, tools, and functions involved in garment creation. The complexities of pattern making and grading require pattern engineers to have extensive knowledge of human body shapes and techniques for transforming design illusions into functional garments. It involves using these techniques to create silhouettes and fits that accommodate a moving body, based on a 2D pattern that results in a 3D garment.
Ease allowance is another technical element that defines the space between the garment and the wearer's body. It ensures the garment allows for movement. This allowance is incorporated into the garment's length and width, extending beyond the basic body dimensions. The amount of ease allowed depends on considerations of style, movement, and fit. Generally, two main types of ease are used in garment design: design ease and wearing ease. Wearing ease is defined as the difference between body and garment measurements, providing the wearer comfort and mobility. Design ease is added to the garment's design to create special effects and various silhouettes. Additionally, ease is influenced by the fabric's composition, properties, quality, and weight. Less ease is required for knitted fabric than for woven fabric, and less, or even negative ease, can be used if the fabric includes stretch.

MATERIAL PROPERTIES
Material Properties in clothing refer to the inherent characteristics of the fabrics or materials. These properties influence how a garment fits, feels, performs, and behaves over time. The properties of the material determine its suitability for specific uses, comfort, durability, and size grading.
Stretch & elasticity is the ability of a fabric to expand and contract, usually due to the presence of fibers like spandex or elastane. Elasticity refers to a fabric's ability to return to its original shape after being stretched.

Weight of a fabric refers to its density, which affects how heavy or light it feels.
Thickness refers to how thick or thin the fabric is in terms of its structure and material composition.
Durability refers to the ability of a fabric to withstand wear and tear over time, including resistance to abrasion, pilling, and stretching.

Material is an essential factor affecting the fit of a garment, particularly the mechanical properties of fabrics such as stretch, and elongation due to the fabrics' self-weight "Elongation due to the fabric's self-weight" refers to the stretching or lengthening of the fabric that occurs because of its own weight (This means that the fabric, when hanging or under its own weight, can stretch out or deform to a certain extent). When creating a pattern, the engineer evaluates and integrates fabric properties with the context of use before determining the shape and ease of the pattern. If the pattern or style is to be produced in various fabric qualities, such as woven and stretch woven fabric, modifications based on the extension and recovery properties of the stretch fabric will influence the calculation of size break intervals, reducing them accordingly. Understanding fabric properties, in line with knowledge of the target audience's body characteristics, is essential when deciding on ease, shape, and construction techniques.

PROPORTIONS & SCALING

Proportions refer to the relative sizes and measurements of the different parts of the garment and how they relate to the wearer's body.

Body Proportions: Involves understanding how different body types vary in shape and size. The proportions should complement these natural variations.

Design Proportions: In addition to body proportions, the designer's choice of proportions within the garment itself plays a significant role. Meaning the proportions are relative to the natural body. Visual Proportions: Proportions are also considered in terms of visual balance. By adjusting proportions, garment can emphasize or downplay specific body areas.

The scale of details relative to the silhouette contributes to how a garment is perceived and how it flatters the body. The proportions of the design details must be carefully considered in relation to the overall silhouette to maintain visual harmony and achieve a balanced aesthetic.

SIZE RANGE & SIZE BREAK INTERVALS

The required size range is determined by analyzing the target customer niche, taking into account both the smallest and largest sizes needed for the market. The size break intervals, or the increments between sizes, depend on the number of unique sizes a company intends to offer. In essence, the overall size range is divided by the desired number of sizes to create the intervals. However, if these intervals are too wide, it increases the chances that customers will fall between sizes, leading to potential fit issues. This can result in dissatisfaction, as customers may not find the right fit for their body shape. To mitigate this risk, it is necessary to factor in fit requirements alongside the size range and break intervals.

Another key factor to consider is aesthetic grading, which is the process of adjusting a garment's proportions to maintain a consistent visual appeal across different sizes. As size increases or decreases, the body form typically changes as well—often requiring adjustments not just to measurements but to design elements like silhouette, lines, details, and proportions. In this context, it is essential to work with multiple sizing standards to address the specific needs of various niches within the market.

FIT DNA

A Clothing Fit DNA is a comprehensive framework that combines design principles, body proportions, fabric choice, ease, grading systems, and fit testing to create a consistent and reliable garment fit. It is central to the identity of a brand and ensures that its customers have a satisfying and comfortable fit experience, making the clothing both functional and flattering.

5.1.5 BODY CHARACTERISTICS

Technical fit covers the theory, tools, and functions involved. The human body is more than just an image or a static visual form; it is a dynamic, living system integral to every aspect of our existence. Biologically, the body consists of complex systems such as the circulatory, nervous, and muscular systems that work together to sustain life. It is equipped with senses that interact with the environment and a brain that processes complex thoughts and emotions. Each body has its unique form, shape, size, and characteristics, shaped by genetics, lifestyle, and environment, and is adaptable, changing in response to conditions, activities, and stages of life. Body characteristics refer to the physical attributes or traits that define the appearance, mass, and proportions of an individual's body. In a fashion context body characteristics must be factored in when deciding on the shape and design of a collection.

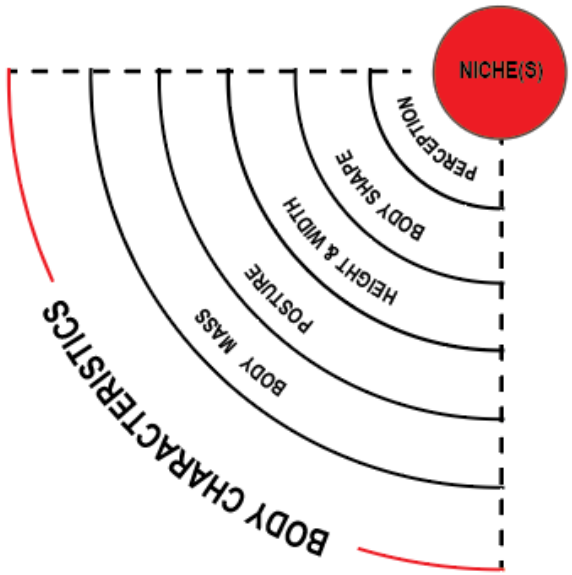


Figure 20: User Centric Model; Body Characteristics, MCC Fashion 2024

BODY MASS

Body Mass: Refers to the total weight of a person's body. It is often measured in terms of body mass index (BMI), which is a widely used tool to categorize body weight relative to height. However, body mass is also a term used to characterize the depth of a person's body, it refers to the three-dimensional profile or the volume of the body. This concept goes beyond simply measuring weight and instead focuses on the depth or thickness of the body in various areas.

HEIGHT & WEIGHT

Height (vertical) and width (horizontal) of the body are fundamental to determining proportions, which influence how clothing fits, feels, and flatters the body. The key to good garment design lies in understanding the relationship between these dimensions and how they interact to create balance.
The interplay between full height and body width affects how the body's proportions are perceived in relation to one another. Clothing needs to be designed not only for the height and width of the individual measurements but also how they relate to create a balanced and flattering silhouette.

A person's full height influences the overall proportions of their body, which in turn affects how clothing fits. The total height is typically measured from the top of the head to the soles of the feet, however it's important to note that the distribution of height across the body (such as the length of the torso and legs) varies among individuals. Height can vary significantly even within specific niches. This diversity can be addressed through specialized size ranges (standard customization), such as **petite** for shorter individuals and **tall** for taller individuals. These categories help reducing the need for significant alterations.

BODY SHAPE (3-Dimensional)

In the context of clothing, body shape refers to the natural contours and proportions of a person's body in three dimensions: height, width, and depth. It encompasses the overall structure and measurements of the body, considering both the skeletal framework and the distribution of body mass (such as fat and muscles) across various areas. The 3-dimensional body shape provides a comprehensive understanding of how the body fills space and interacts with clothing, significantly impacting the fit and silhouette of garments.

Body Proportions:

Body proportions refer to the relative sizes of different parts of the body, such as the relationship between the bust, waist, and hips. The way these areas align and compare to one another shapes the garment's fit and can influence the wearer's overall appearance.

Contours and Silhouettes:

The contours of the body include the curves and lines that shape the figure, such as the curves of the waist and hips or the structure of the shoulders. These contours are important because they directly affect how fabrics drape and fit on the body, influencing the garment's overall silhouette and visual appeal.

Body Volume:

Shape recognition also involves considering the volume of the body. For example, some individuals may have a smaller waist with more volume in the hips, or a broader upper body. These variations in volume influence how a garment should be constructed, as different body volumes require tailored cuts and adjustments to ensure both comfort and aesthetic balance.

BODY PERCEPTION

The perception of fit is a highly subjective experience that is deeply influenced by an individual's body shape. How a person views the fit of a garment is not only based on how it physically fits but also on how the garment makes them feel in terms of comfort, appearance, and confidence. Clothing fit and body shape are interconnected. The relationship between the two plays a role in how garments are received, both by the wearer and by others.

READY