Trace

MCC FASHION; Mass Customization for Circularity

trace
a transition towards
circular economy

PARTNER AFFILIATIONS

The project is constituted by three academic partners and two partner companies.
The project lead is Center for Applied Research in Textiles, Design & Circularity, VIA University College [1],
other academic partners are, Design School Kolding [2], and Royal Danish Academy [3].
The partner companies are SELECTED FEMME [4] and COZE Aarhus [5].

TIMEFRAME & FUNDING

The timeframe for the project is two years from 01.04.2023 to 01.04. 2025.
The project is funded by Innovation Fund, Denmark [6]
The project refers to the TRACE roadmap [7]
Further information can be found on the official website for TRACE [8].

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1. Introduction & background

INTRODUCTION

There is a burgeoning acknowledgement that the fashion system needs new approaches and alternative business models to improve its currently devastating impact on the environment. Industry change initiatives are dominated by a focus on alternative materials such as organic cotton and recycled polyester. Changes that primarily seek to maintain the current 'fast fashion' approach with a focus on quantity and price, but with the consumption of materials with presumably less environmental impact. An approach, which maintains the mechanisms of producing quantities of clothing products for the mass market with the approach of 'one standard size fits all.'

Archetypically, fast-fashion products are designed inside out, as needs are interpreted and put together based on trends and requirements specified by sales and marketing functions. In fast fashion, designers commonly do not interact directly with potential customers, but draft designs based on trend interpretation and price segmentation. In this discourse, understanding of the users' environment, points of view, and everyday practice are downgraded. Breaking free from fast fashion, the objective of this project is to rethink apparel strategies through understanding customers' reality and values, thus allow realism and pragmatism to be equated speed and price to market.

Meeting changing demands from legislation, market and end-users demands challenges the current fashion system as it is based on standard solutions. Supporting a systemic change requires a data flow to inform strategies.

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1. BACKGROUND

The point of departure and the foundation for the research project, Mass Customization for Circularity (MCC Fashion) is constituted by the collaborative datasets and merging the findings from two completed PhD projects.

1.1 EXISTING DATASETS

From 2016 - 2019, two individual PhD projects have collaboratively collected data about Danish women's relationship and interaction with clothes and fashion. The two projects focused on respectively fit & sizing; "To Fit in Danish Fashion. A study addressing inclusive fit & sizing in fashion ". [9] and age & style; "Age-ency in the Construction of Style Narratives. A study on how ordinary mature Danish women construct style through clothing"[10]. The findings from both projects provide an empirical foundation that underscores the need for the industry to approach product development and customer expectations with greater nuance, beyond what the current fast fashion model allows. Findings indicate that 25.3% of the participating women are unable to engage with their preferred and desired style preferences because the current product ranges do not accommodate their body types. Only approximately 10% of participants match the current body measurement standards (DK Standard) employed by the industry. Both studies identified causes that require action, as well as multiple niches within clothing consumption that need to be addressed. Understanding customer needs and preferences is central to both studies, and we advocate for a deeper understanding of users, as well as the adaptability of knowledge, to create sustainable product strategies and inclusive product development frameworks. Mass-produced clothing not only increases pressure on the environment but also places additional strain on both retailers and consumers.
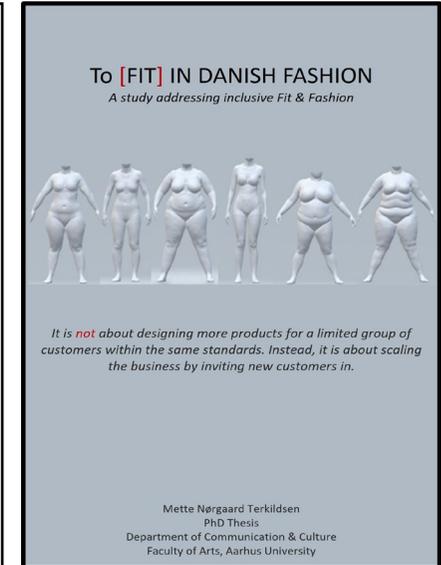
Illustration 1: Front page, Ph.D. Thesis, Malene Pilgaard Harsaae, 2020 (Left picture) Front page, Ph.D. Thesis, Mette Nørgaard Terkildsen, 2024 (Right picture)

Acknowledging that fast fashion has made it affordable for everyone to buy fashionable products, we must realize that not everyone has the pleasure of access to style, as real people come in a variety of shapes and sizes, which often deviate from industry standards and assumptions of average. We argue that a system can be too simple and single-sided; our research suggests revisiting the market to assess the causes and consequences of the present structure, thus identifying the unmet need of the customer. Unmet needs are strategically important, as they represent opportunities for businesses and point at ways to break into market share or increase existing share in the market. Even more important identifying unmet needs and responding hereto, bear the potentials of reduction in the overproduction of products that never meet a user.

1.2 METHODOLOGY

The two PhD projects have accumulated both individual and joint datasets. The joint datasets consist of questionnaires (n=312 age 18-77), semi-structured interviews (n=113 age 18-77), and photo documentation (n=119 age 18-77), while the individual datasets include body scanning (n=350 age 18-77), in-store observations (n=150), informal conversations (n=250 age 18-77), and wardrobe-inspired in-depth interviews (n=4) among Danish women born between 1940 and 2000.

The data collection methods used in the two PhD projects contributed to a comprehensive understanding of user preferences, product performance expectations, and how these elements align with body types and market needs. As a result, the projects provided insightful data that were brought forward into this project.

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The model (figure 1) represents the intersection of three key elements that drive clothing design and consumer decision-making: Body, Preferences, and Market. The core idea behind this model is to explore how these three elements influence each other and, when combined, lead to highlighting underrepresented groups (niches) or untapped opportunities. This Venn diagram visually illustrates how these elements overlap and influence one another in the context of clothing design and consumer behavior.

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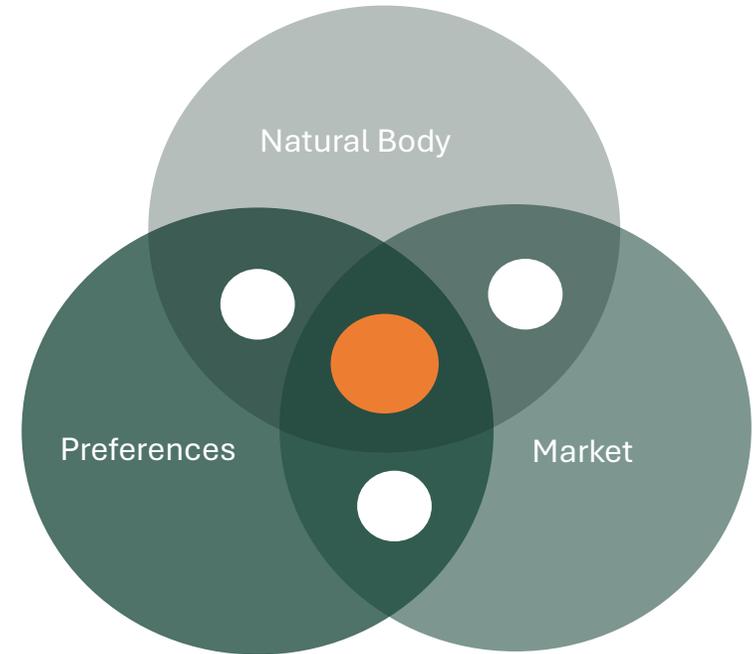
Figure 1: The intersections between the three key elements from the two PhD projects.

1.3 MAPPING THE CURRENT SITUATION

The two PhD projects have analyzed both shared and individual datasets. Although the research questions and analytical approaches differed between the projects, they both aimed to understand Danish women's pain and gains with clothing and thus contributed to mapping the current situation. Key findings and highlights from the projects are presented on the following pages.

1.3.1 AGE-ENCY IN THE CONSTRUCTION OF STYLE NARRATIVES.

Looking at the current situation from an age-related perspective, central to the Ph.D. project: "Age-ency in the Construction of Style Narratives."[2], focused specifically on identifying how age and aging influence clothing choices and how age is experiences in an apparel context. The project operated with two key concepts, the concept of style narrative as introduced by Tulloch, 2010 [11] and the intangible concept of age-ency coined by the project to address the age informed construction of style narrative exercised by mature women, 50+.

Age-ency is how we navigate ongoing negotiations of ageing in style: transitions between past and present selves, between being age-appropriate and being relevant in contemporary terms, between feeling of self and the adjustment to a changing body shape and a changing socio-political age-ordering. Age-ency is how we make sense of age-related expectations and experiences of pleasures and displeasures.

Style narrative is the more material, visual and expressive outcome of how age is experienced and exercised in relation to clothes. The journey of negotiation gather individual imprints and preferences for specific clothing choices along the way. Style narrative is the 'spoken' tangible outcome of how women experience, exercise, and express their age through their clothing selection and construction of style. How they construct style as part of their age-ency.

Based on the insights from the questionnaire (n=312), the semi-structured interviews (n= 113), photo documentation (n=119), and wardrobe-inspired in-depth interviews (n=4), the project explored and identified style niches among Danish women, 50+.

The analyzing part was framed by the concept of generational sites [12,13].The generational sites constitute a shared period in the women's life where they have been exposed to similar zeitgeists and thus potentially share coherent imprints from their youth. The imprints from youth contributed to understand the age-related decisions they took in mature life to construct their individual style narrative through their clothing choices. These individual style narratives enabled the project to identify and propose the formation of several style niches within a generation. The project thus defined a niche as a specific group of women with coherent style preferences and attitudes to their interaction with clothes informed by the way they exercised age-ency.

The model below, figure 2, was developed within the project to explore and address how the participating women navigated their age and aging process in relation to clothing choices. [10]
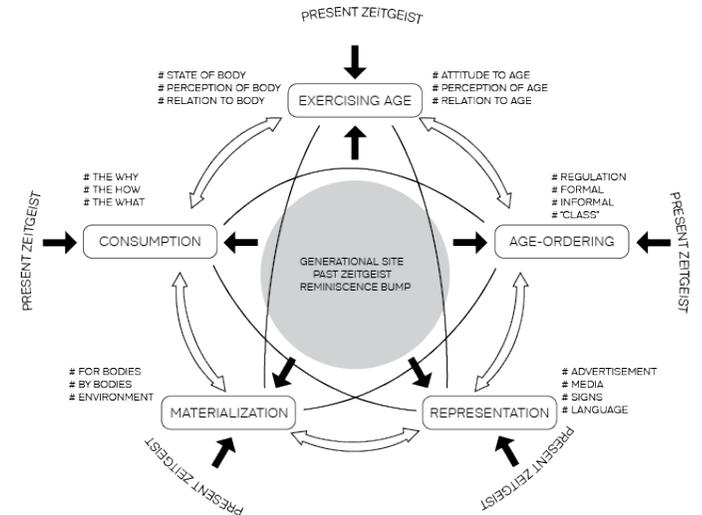
Figure 2: Age-ency model. [10]

The semi-structured as well as the wardrobe inspired interviews provided different aspects and perspectives on mature women's interaction with clothes, their preferences, considerations, and frustrations. These sentiments derived from their experiences with the product range offered by the industry together with the individual experiences related to age and the perception of age among peers and in society in general.

"I would like someone to take into account that the body changes, I want the same as the young [women], but better fit and better quality".
Bodil, born 1960 on satisfaction with industry

"They (the industry) have a youthful image of what bodies look like. It is produced for young girls with out fat and cellulite"
Britta 1963 on satisfaction with the industry

"There is certainly something about dressing according to your age. There are some things one should not do. When I see those women in their 70s in short dresses, I think 'You need another 10 cm of length.'"
Kirsten, born 1941, on good taste

Overall, mature women found it difficult to match their style preferences with the offerings due to the industry's preoccupation with the young body. They did not find that the changes imposed on the body by the natural aging process were accommodated by the fit and size ranges used by the industry.

Other women emphasized style related issues, articulating that many style variations only catered to young women, whereas their specific style preferences were difficult often impossible to find.

"Then there is something that is really retro and I have many young girlfriends who look really good in it. But I just look like the age I have if I wear it".
Jette, born 1951 on second-hand finds

"Too much of the same "Jackpot- like style, I feel the industry like putting women in a box, they forget aesthetics, they could look at male fashion"
Berit, born 1961 on satisfaction with industry

"It's important that I don't feel outdated, look old-fashioned."
Anne, born 1953 on the influence of trends

"I'm crazy about velvet, but I don't wear it if it's not trend. I want to follow the time, I don't want to get stuck".
Inger, born 1965 on the influence of trends

Based on the informants' individual style constructions and narratives, which emerged from the semi-structured interviews and photo documentation, collective style niches and narratives were established. The style niches provide an indication of the prevailing style expressions among mature and older women that can be used by designers as guidelines for understanding and addressing the preferences of these groups of women.

The women in this study offer varying versions of a sometimes-uncomfortable relationship with clothing in their assessments of and satisfaction with the products offered by the industry. They point out the lack of appropriate fits and shapes, the dominance of style offerings best suited to younger audiences, and a general lack of knowledge and understanding of their preferences and needs.

1.3.2 "To Fit in Danish Fashion"

Looking at the situation from both a customer and industrial perspective, the study examined the implications of current fit and sizing systems, exploring what is needed to support inclusivity in the fashion industry. Grounded in pattern engineering and the Danish context, the research focuses on body-form classification systems, which are categorize into **sizing systems**, **body-form systems**, and **alteration systems**.

The empirical material includes in-store observations, interviews, questionnaire surveys, and body scanning of Danish women aged 18-77. In addition to gathering primary anthropometric data, the study placed significant emphasis on hearing women's own voices and capturing their personal statements and experiences, giving valuable first-hand insights into how individuals experience and interact with, as well as how they are affected by, the existing fit and sizing standards in fashion and clothing.

"It's not because I can't find a style of clothing that matches my preferences; it is just not available for my shape and size...so; in reality, I have a relatively limited selection of clothes to choose from; therefore, I find it difficult to pursue a personal clothing style; instead, I try to make up for it with accessories and shoes"
(Quote, Anne, age 23).

The research highlights the challenges women face when shopping for clothing, especially those whose bodies do not conform to "average" standards, and revealed that even within populations with similar measurements, there are significant variations in body form, posture, and proportions. These variations are often overlooked in mass production.

Adopting a systems thinking approach, the study analyze how different elements within the system interact and affect one another. It focuses on the relationships between components rather than examining each in isolation. In the context of clothing fit and sizing within an industrial framework, systems thinking allowed the study to explore the interconnectedness of body types, design practices, production processes, and consumer preferences, thus identifying patterns, inefficiencies, and opportunities for improvement.
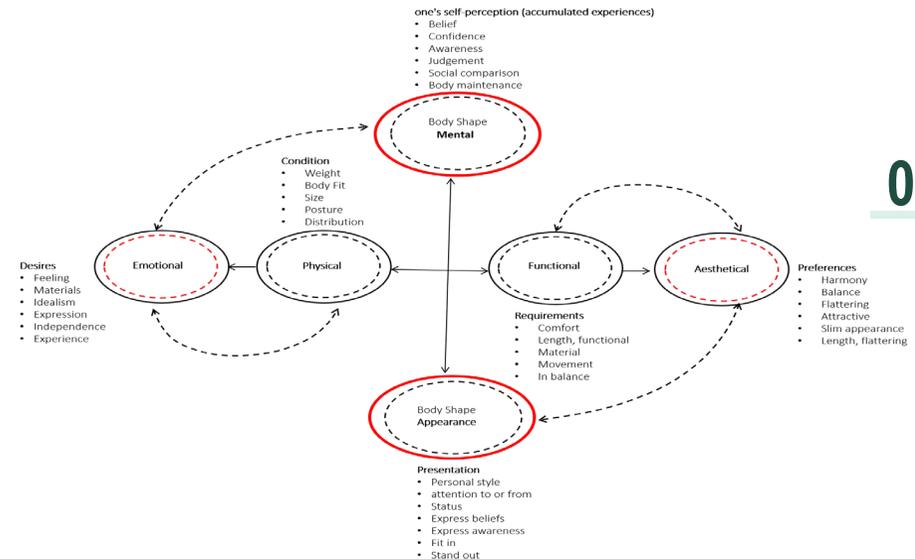
Figure 3: Summarizing of the conversations held with participants during body scanning. The image highlights key points of discussion, focusing on how body shape and sizing impact personal experiences and perceptions. [9]

Technically, the current theory and practice in apparel engineering often neglect body form variation. Both standards and construction theories are typically based on the assumption that an average-sized individual is proportional and, therefore, average in all dimensions. However, this assumption was unsupported in the empirical data. According to the interviews and questionnaire surveys with informants, an overwhelming 77 % of respondents reported fit and sizing as barriers to acquiring the desired look and style. The results of the body scanning survey support this picture, showing that only approximately 10% of the body-scanned women complied with the body shape and measurements included in the standards used in the Danish industry. The detected variation in body form, proportions, and size proved to be greater than what could be supported in a single standard, even among women sharing similar age, size, and measurements. These findings indicate that form variations and flexible systems are necessary to facilitate inclusive fit and sizing.

As a key aspect of inclusive design and fit is the use of a broader range of body shapes in the product development phase. A central focus of the research has been to provide natural real-life avatars that represent diverse body shapes and sizes, as well as provide information on how to incorporate specific body form information's into a product portfolio strategy, thus encouraging a move away from designing all product variants for an "ideal" customer of "standard" shape and size. The key concept is to transition from using a single, uniform standard to implementing micro standards based on customer data, thus accommodating a wider range of body shapes without expanding the product range.

This approach focuses on adapting the existing collection to meet the needs of diverse body forms, sizes, and proportions, rather than creating an excessive variety of styles.

Body Form Classification System:
To address body-form variation and make the information operational for use in product development, the study developed a body form classification system based on a comprehensive analysis of female body shapes. The system works by a systematic evaluation and index coding of contour, posture, proportions, form and body components providing a personalized fit profile. This profile can be used to match customers with existing products or recommend a body shape avatar for fit testing. The analysis and contributions of the thesis can be divided into three areas/levels as Illustrated in Figure 4. Mapping out where we stand, (2) Can current systems be modified into improved versions and finally, (3) What is needed to provide alternatives?
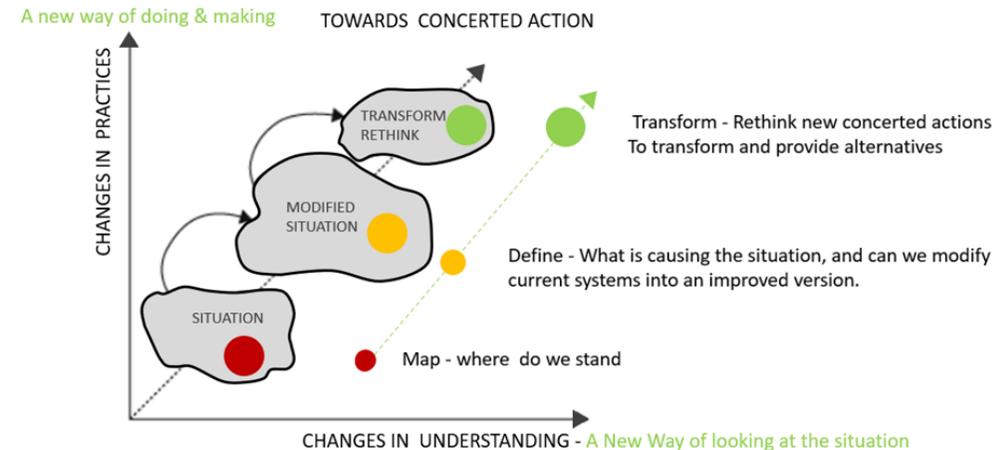

Figure 4: From current situation to transformed situation [9]

1.3.3 FINDINGS, QUESTIONNAIRE

The analysis of the collaborative questionnaire revealed the following key findings. N= 312 respondents divided into six age groups as shown in figure 2.

AGE DIVISION
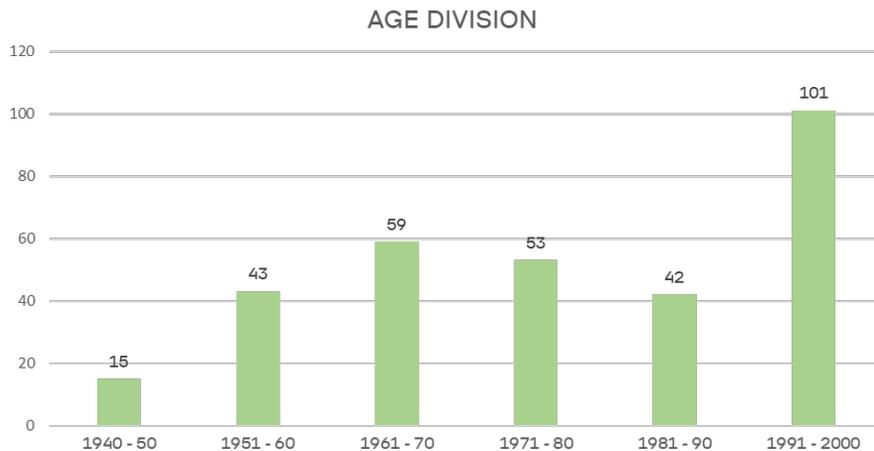
Figure 5: n= 312 questionnaire respondents divided into six age groups [10]

• 77.0% have experienced fit problems when shopping for apparel.

• 67.3% feel restricted due to the limited availability of sizes in the market.

• 51.0% of participants reported negative effects on body image if they cannot fit into the industry's specified clothing sizes.

• 48.0% mentioned that various fit and size issues impact their clothing choices and limit their ability to follow trends.

• 44.3% always or often find it challenging to discover clothing that complements their specific body type.

• 44.1% indicated between two and four different clothing sizes when asked about their size.

• 40.8% regularly face challenges when searching for clothes that align with their aesthetic preferences

• 25.3% of respondents are unable to engage in the style they prefer due to their body type.

1.3.4 THE CURRENT SITUATION

- We have changed ways of working e.g. the implementation of digital technologies and tools, however we have not changed the underlying system, so from a customer point of view we are status quo
- Limited body shape variation – the majority of products cater to an average fit model
- Single measurement system - we rely on a single/standard sizing system that only optimally serves approximately 10% of our customers.
- From a customer point of view - understanding quality, fit, and design variations, not to mention size codes, was difficult due to inexact or insufficient information.
- Sizing Standards & Linear Grading: Identical proportions across all sizes – does not account for body shape variations, , and therefore, many women cannot place themselves in the standards.
- Pattern technical - we provide more of the same, meaning little variation is available, thus customers compromise on fit and style.
- Women in the upper and lower size ranges feel less prioritized.
- Age Matters - body form changes.
- Fit is more than measurements and size.
- Unsold garments remain a major problem, with fit and sizing issues contributing to the challenge.
- High return rate and bracketing is a major concern.

Figure 6: Illustration of age- related variation in body shapes. [14]
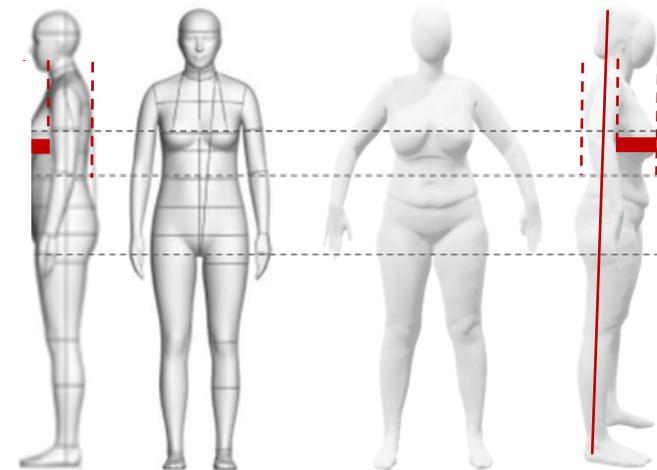
Figure 7: Comparison of Alvaform size 42 to natural body scan avatar size 42 [MCC, 2024].

1.4 MODIFIED SITUATION

Modifying the situation might include:

- Inclusive collection development (elaborated on page 40-45)

- Design critique on a size range

- Targeted measurement systems (micro standards)

- Alteration systems

- Address variation

- Visual communication
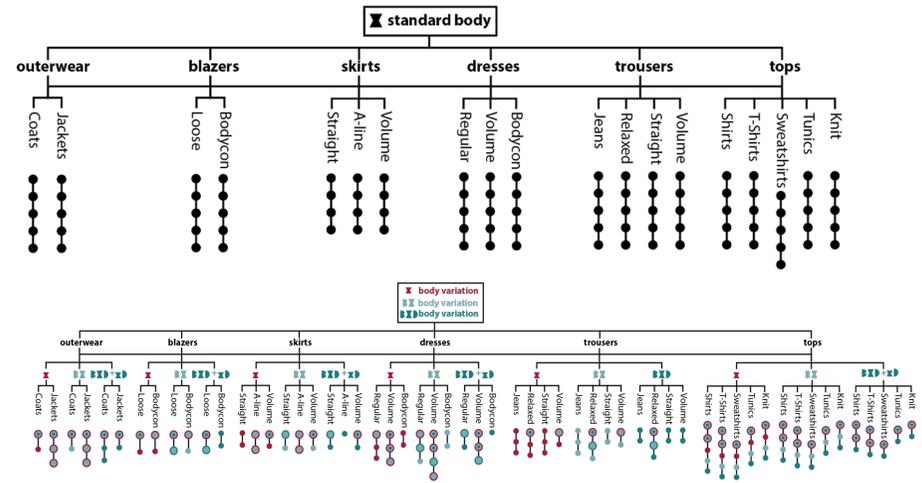
Illustration 2: Inclusive collection development, elaborated on page 40-45.
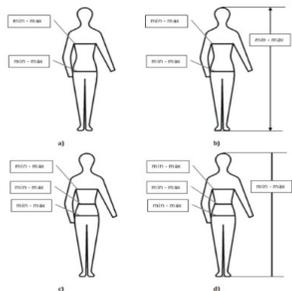
Figure 8.1: Pictogram as suggested in DS-ISO 8559-2-2017 p.17.
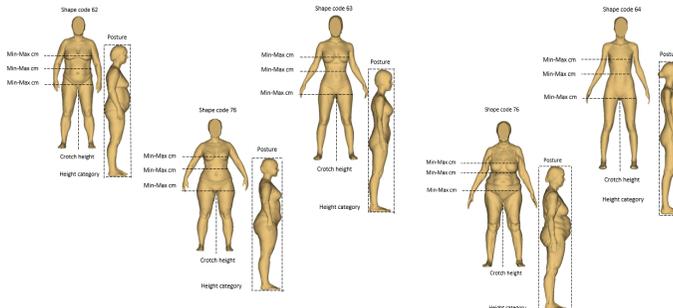
Figure 8.2: Example of natural body shapes intended to replace pictograms.
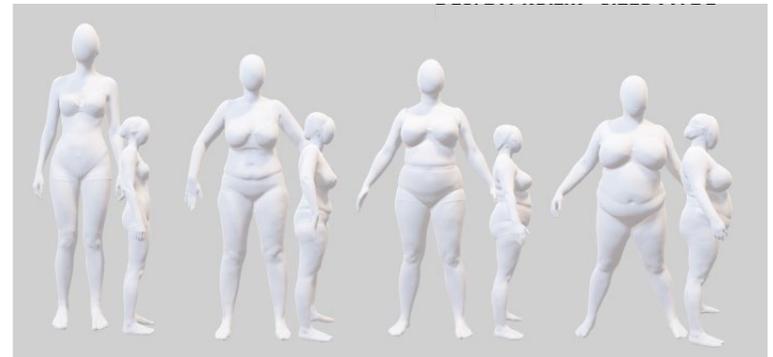
Illustration 3: Body variations calls for design critique on size ranges.

1.5 TRANSFORMED SITUATION

In the future, collaborative efforts between stakeholders will enable the creation of curated, inclusive collections that serve diverse customer segments. This approach will rely heavily on data as the foundation of the design process, with customer insights guiding product development tailored to meet the specific needs of each niche. However, while data offers valuable insights, skilled professionals will remain essential for interpreting this information and curating product offerings. This collaboration will provide both customers and designers with an informed foundation to make better decisions, ensuring that fashion is both inclusive and responsive.

Transforming might include:

- Community based platforms solutions

- Mass customization

- Fit & style profile niches

- Personalization – curated product offerings.

Illustration 4: A section of a database, matching fit and body profile [9]
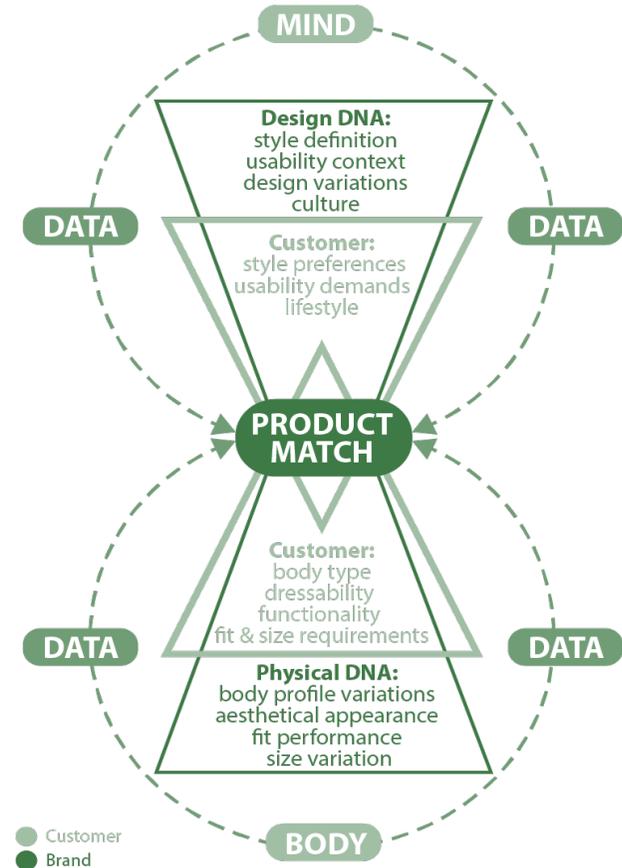
Illustration 5: Body and mind model, developed for inclusive collection strategy [16]

2. Project Summery

2. PROJECT SUMMARY

This project has collaborated with two companies, SELECTED FEMME [4] and COZE, AARHUS.[5] The companies are quite different in terms of size, structure and customer types. Consequently, there are findings that are specific to the individual company, but at the same time there are also some common characteristics.

2.1 DEVIATIONS

As part of the initial analysis, it was noted that both brands rely on third-party manufacturers for their production needs. It was also observed that both brands had outsourced pattern construction and grading. This meant that the fit was controlled based solely on measurement charts. This reliance on external manufacturers and the absence of internal pattern and grading processes highlighted significant obstacles to the implementation of a full mass customization system. Implementing mass customization requires seamless coordination between different stages of the supply chain, from design to production to delivery. Companies that do not control the entire production process struggle to ensure this level of integration.

Consequently, the project has centered on "Transparent Customization." This type of customization is not visible to customers but is guided by data driven insights. The company adjusts its' product offerings based on the collected data about customer needs, behaviors, and preferences. The goal is for customers to feel that the products align with their needs and preferences, even if they are unaware of the specific adjustments made.

This also means that the initial project aim of transforming systems was disrupted early in the process and the project had to settle with modifying systems.
However, the project has successfully contributed to transform approaches, attitudes and mindsets within both companies.

2.2 FINDINGS, COZE

In the COZE case, the collected user data demonstrated that a specific body type within their customer segment did not feel catered for in their range of trousers. This specific body type is mainly found among women 55+ and typically has a minimum 5 size differences between waist and thigh width (very thin thighs). Body scanning datasets from previous research [9] qualified that this specific body type currently not catered for in the market constitutes 10% of Danish women.

MCC & COZE solved this challenge in collaboration. MCC exemplified how the implementation of an additional body type is practically possible by developing a new trouser base pattern that addresses this specific body type.

"We have developed new models for other figure types, based on data and not just based on salespeople's or agents' statements."
[Marlene Ihler, Head of Design, COZE]

COZE designed and ensured the materialization of the new model ROUGE and included it in the collection. It turned out to be crucial for the success in relation to COZE that the project could develop, exemplify and test the new trouser model, while COZE could ensure its implementation by including it in their collection and offering it to their customers. The new model has proven it's relevance by being one of the bestselling trousers three month after the launch.

"We think differently in terms of pattern making – we need to move away from the standard way of doing things – the standard body has always been the starting point."
[Betina W. Erneberg, Pattern maker, COZE]

The exemplification of the new trouser model has helped the COZE team to gain an understanding of how they can still work in a standardized manner, even though they are now working with multiple standards as opposed to a single standard approach. In this way, the process of the new trouser has helped to create the understanding that an additional standard does not result in more work, rather a different way of working, thus breaking down the complexity that is generally experienced when changes are made to well-known processes.

"In the industry, we have used the same systems for everything in a busy everyday life, but if we look around, there is not that much representation of body standards."
[Lena Trend, CEO, COZE]

The process has furthermore encouraged and inspired COZE to consider implementing a third body type standard. Acknowledging how the data collection has qualified their second body type standard, they intend to validate a third body type through their own data collection.

"The data collected from Mette's PhD has been important - that's why it will be less about sentiments but based on real-life data."
[Marlene Ihler, Head of Design, COZE]

Another important finding is the realization that implementing a new model catering to a different body type replace another model in the collection that did not cater to this body type. Meaning that COZE has initiated their work with developing their inclusive collection (range plan) strategy. Consequently, the next step for COZE is to evaluate their current collection and evaluate which models are needed to cater to a broader audience of their customer segment.

"We intent to test version 3 of the mass-customization customer journey with focus groups."
[Lena Trend, CEO, COZE]

2.3 FINDINGS, SELECTED FEMME

The initial workshops focused to a great extend on identifying the different body types that the current SELECTED FEMME collections cater to before the MCC team began the data collection through observations. The data collection focusing on the SELECTED FEMME customer groups revealed, among other things, that their design DNA attracted two customer groups who were unable to engage with their product range due to their body types.

One body type had a larger bust than the SELECTED FEMME fit could accommodate, which mainly created challenges in acquiring dresses, tops and blazers. Whereas the other body type had wider hips, which particularly affected the ability to wear some SELECTED FEMME dress and specifically trouser designs. However, the dialogue between SELECTED FEMME and MCC resulted in pursuing dresses as focus area.

"We have also begun to focus on whether our pants have the measurements/fit that can accommodate more body types – our critical approach has been improved".
[Malene Schalck Rasmussen, Senior designer, SELECTED FEMME]

The observation methods employed by the MCC team to collect the data, inspired the SELECTED FEMME design team to perform their own observation sessions enabling a comparison of findings. Furthermore, the SELECTED FEMME design team now considers to implement frequent observation sessions in their own shops to obtain deeper insights into their customers needs, preferences and challenges.

"We have to look at products from the outside in (what the customer says) we should not build it on assumptions - and consider how we should communicate new initiatives so that customers understand it."
[Malene Schalck Rasmussen, Senior designer, SELECTED FEMME]

The data collection and the subsequent dialogues have created an increased attention to alternative approaches to design as well as pattern making. SELECTED FEMME has approached some of the first steppingstones towards mass customization and an inclusive collection strategy by initiating a modular design approach and establishing a module library.

"How can we systematize the product development process in terms of internal communication and communication to suppliers."
[Sandra Wrochniak, Designer, SELECTED FEMME]

Additionally, SELECTED FEMME has addressed the implementation of cutlines in the designs to create a foundation for incorporating form that can cater to more variation in the final design and thus include more diversity and address more body types and sizes.

"The fact that at Selected people discuss and consider cuts in designs makes it easier for me to incorporate form."
[Malene Stenberdt, Pattern maker, SELECTED FEMME]

2.4 FINDINGS, PROCESS

As stated previously the project deviated quite early in the process due to the companies' dependency on third part stakeholders. The success of this type of project depends on both available technologies and available skills. As most Danish fashion brands are trading companies, it can be difficult to offer mass customization, as they do not have the necessary production setup or the required data and systems to support small-batch production. However, while it may be tempting to rely on standardization for efficiency, significant differences in body types, and preferences exist, even within Europe. Until these differences are addressed, customers will continue to face compromises, devaluing the products and shortening their use periods, thus contributing to overproduction in the clothing industry.

There must be an acceptance that production will become more complex. Brands will need to consider flexible production systems if they want to reduce overproduction. By developing product strategies, designing variables, and including more body types in the pre-production phase, a more targeted assortment can be offered, hopefully leading to a longer usage phase and thus helping reduce fast and frequenr replacements. At the same time, a customised strategy potentially provides an opportunity to attract new customers. Additionally, companies could generate revenue by offering style and product-matching services.

The 2-year timeline for this type of project can challenge the possibilities of achieving the aims, objectives and deliverables. It is time-consuming to establish the security and confidentiality between the partners, which is a prerequisite to create the space of opportunities that ensures the achievement of the project's goals.

The many workshops and dialogue meetings have been crucial to the success of the project and the ability of the researchers to talk through data is an important contribution to creating the productive trust. The first workshops consisted mainly of an introduction to knowledge from the MCC team to companies, but as the project progressed it changed into a true interdisciplinary collaboration.

"We have created a room for conversations that address more layers, improving the product that ends up with the customer"
[Malene Schalck Rasmussen, Senior designer, SELECTED FEMME]

For both companies, the project has contributed to new insights and understandings, and perhaps specifically a significant change in they way in which they include perspectives of real bodies in their conversations and dialogues when planning and developing their designs and collections.

"An internal dialogue has arisen in relation to women's body types and terms for it and how COZE as a brand can communicate to users."
[Lena Trend, CEO, COZE]

2.5 READING GUIDELINES

In addition to the summary of the project findings on the previous pages, this report presents the milestones, deliverables, results and recommendations that constitute the outcome of the project, Mass Customization for Circularity.

The report is structured around four sections. The first section, Chapters 1 and 2, introduces the background and presents existing research and datasets that form the basis of the project, as well as the summary of the project findings. Chapter 3 introduces the concepts that frame the project. The next section, Chapters 4 and 5, focuses on the research approach and the milestones achieved during the project. Chapters 6 and 7 delve deeper into some of the results presented in the project summary and elaborate on the project deliverables, which are demonstrated through the presentation of the two business cases. These chapters includes extracts from workshops and presentations with the companies. Note that figures and illustrations in the two chapters with the case descriptions are unnumbered. The final section, Chapter 8, presents selected findings, reflections and recommendations. The report concludes with references and lists of figures and illustrations.

2.5.1. DELIVERABLES
The MCC project includes four deliverables:

- A holistic analysis of users' preferences within fit, sizing and style that will serve as foundation for WP2.

- Two exemplary niches that can inform technological systems

- Development of new datasets based on feedback from user groups. Mapping of the companies' ability to adopt and implement a holistically oriented and highly complex interface

- Plan for scalability identifying further research and development activities based on the model for mass customization.

2.5.2. MILESTONES:
The following milestones have contributed to reach the deliverables of the project.

- Establish a method/analysis that can organize and interpret an extensive amount of complex data into a workable model.

- Identify a relevant interface between design and technology.

- Test results demonstrate applicability of the interface.

- Test results demonstrate value of the interface.

3. Concepts & Clarifications

3. CONCEPTS & CLARIFICATIONS

3.1 INTRODUCTION

This project employs and is framed by several different concepts which are introduced in the following pages.

The concepts are summarized in short versions that form the basis of the report. We present the concepts as they are used in the project, which means that it is not an in-depth explanation of the concepts as such. We introduce the following concepts: Industry 5.0, Design Ontologies, Circular Economy, Mass Customization, and Niches. Other concepts are introduced in relation to the case work.

3.2 INDUSTRY 5.0

European industry is a key driver in the economic and societal transitions that we are currently undergoing. To remain the engine of prosperity, industry must lead the digital and green transitions. This approach provides a vison of industry that aims beyond efficiency and productivity as the sole goals and reinforces the role and the contribution of industry to society.

It complements the existing "Industry 4.0" approach by specifically putting research and innovation at the service of the transition to a sustainable, human-centric and resilient European industry. [17a]

Industry 5.0 refers to robot and smart machines working alongside people with added resilience and sustainability goals included. Where Industry 4.0 focused on technologies such as the Internet of Things and big data, Industry 5.0 seeks to add human, environmental and social aspects back into the equation [17b] and thus fitting the project.
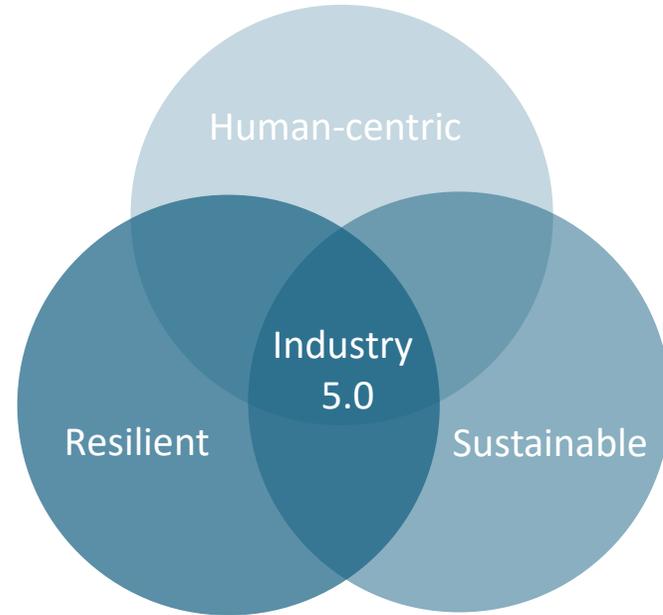
Figure 9: Industry 5.0, MCC Fashion 2024

3.3 DESIGN ONTOLOGIES

In philosophy, ontology is defined as the study of the nature of being and existence.

In computer & information science, ontology is a way of showing the properties of a subject area and how they are related, by defining a set of terms and relational expressions

In the context of this project design ontology includes a series of characteristics that we employ to identify niches and to address and cater to the needs and preferences of an identified niche of users.

The project has developed a model, User Centric Model, to identify niches, which is introduced on page 29-37.

3.4 CIRCULAR ECONOMY

"The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended.   In practice, it implies reducing waste to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible thanks to recycling. These can be productively used again and again, thereby creating further value. This is a departure from the traditional, linear economic model, which is based on a take-make-consume-throw away pattern. This model relies on large quantities of cheap, easily accessible materials and energy. Also, part of this model is planned obsolescence, when a product has been designed to have a limited lifespan to encourage consumers to buy it again. The European Parliament has called for measures to tackle this practice".[18]


Figure 11: Circular Economy & focus area of this project. MCC Fashion 2024

Figure 10: Illustration, Circular Economy [18]

This project focuses specifically on qualifying and validating products based on data driven knowledge about users before starting the production, thus addressing the pre-production phase. Furthermore, the project includes mass customization and thus addresses the production phase as well. The project includes strategies for inclusive collection development (see page 40-45) and strategies for mass customization (see page 19-20 & 51 –55) The aim is to reduce the number of products with 20% and still maintaining the same revenue through alignment between companies' offers and consumers' requirements.
In relation to circularity this approach addresses specific areas of circular economy rather than the full circle as illustrated on the visualization, figure 11 (own illustration based on EU visualization).

3.5 MASS CUSTOMIZATION

Mass customization (MC) is a manufacturing and business strategy that allows companies to produce goods and services tailored to individual customer preferences while still maintaining the efficiencies of mass production. It combines the flexibility of customized products with the cost advantages of mass production, enabling businesses to offer personalized items at scale.
Mass Customization is not a new concept, in 1989 Davis's seminal publication "From Future Perfect: Mass Customization" [19] explored how products and services could be created as one-of-a-kind items on a large scale. In Davis's work, he introduced the concept that customization could take place at different stages within the supply chain. In 1993, Pine made a significant contribution with his work "Mass Customization: The New Frontier in Business Competition" [20] in their research they took an interest in understanding the efficient Japanese manufacturers of the 1970s and 1980s, who were able to produce goods at lower costs and higher quality based on Just-in-Time manufacturing systems.

The Just in Time system originated in Japan, most notably with Toyota in the 1970s.The primary goal of JIT was to eliminate waste by producing goods only when needed, in the exact quantity required, and to deliver them at the right time. This system became a cornerstone of lean manufacturing, focusing on the following principles:

- Minimizing Inventory: JIT aims to reduce the need for storing large quantities of raw materials, components, or finished products. Instead of mass-producing products and stocking them up, the goal is to produce them only when demand arises.

- Reducing Waste: By synchronizing production schedules with demand, JIT minimizes overproduction, waiting time, and inventory costs, which are considered wasteful in the production process.

- Efficiency in Production: The system demands careful planning, streamlined production lines, and close coordination between suppliers and manufacturers. Suppliers are expected to deliver parts exactly when needed, not too early or too late, to ensure smooth workflow.

- Continuous Improvement: JIT encourages a philosophy of continuous improvement or constantly evaluating and improving quality, processes, and overall productivity.

- Demand-Driven: JIT is inherently driven by consumer demand, which dictates how much and when products should be produced, fostering a more responsive and flexible manufacturing environment.

The integration of JIT principles with mass customization systems allows manufacturers to produce personalized products at scale while maintaining streamlined, cost-efficient operations.

However, at the core of mass customization (MC) is the customer. Understanding which aspects of customization are most valuable to customers is crucial for the success of MC. Data-driven design processes play a key role in enabling mass customization by integrating customer insights directly into the design phase. This approach provides valuable data on how to best serve customers and helps establish micro standards, enabling brands to tailor their product offerings to specific niche segments.

Gilmore and Pine (1997) [21] identified four distinct approaches to customization: collaborative, adaptive, cosmetic, and transparent. These approaches represent different levels of customization, with varying degrees of customer involvement in the design process, offering businesses different ways to engage with their consumers and tailor products.

Collaborative Customization

Collaborative customization is the most customer-involved approach to mass customization. In this model, the customer plays an active role in designing the product. The process typically involves direct interaction between the customer and the company, often through a configurator or a series of design decisions that the customer can make.

- Customer Involvement: High. The customer is heavily involved in defining the product's specifications, ensuring that the final product meets their unique needs.

Adaptive Customization

Adaptive customization refers to products that adapt to the customer's preferences. While the product itself remains standard, it can be adjusted or configured based on the customer's needs, through the customization of specific features.

- Customer Involvement: Moderate. The customer can adjust a set of features or choices to match their preferences.

Cosmetic Customization

Cosmetic Customization focuses on superficial changes to the product that don't affect the underlying form or function.

- Customer Involvement: Low to moderate. Customers can choose from a set of predefined options, but the core structure of the product is not altered.

Transparent customization

Transparent customization relies heavily on data analysis to predict and adapt to customer needs. It is a method where products are targeted to meet individual customer preferences based on data analysis, without the customer being explicitly aware of the customization process. This approach can be highly effective when targeting niche segments, as it allows brands to offer tailored products without requiring active customer participation. The key here is that customization occurs behind the scenes, based on data-driven insights, while the customer receives a product that feels personalized without being explicitly aware of the customization process.

In niche markets, where customer preferences can be highly specific, transparent customization provides a way to deliver tailored product variations that align with these needs. By analyzing customer behavior and preferences through data-driven insights, companies can develop micro-standards—product variations that cater to smaller, specialized groups within the broader market.

- Customer Involvement: Low. The customer is not actively engaged in the customization process but benefits from it indirectly through personalized recommendations or pre-configured options that suit their needs.

Transparent customization was the approach implemented in this project, focusing on integrating customer data into the design process to target niche segments. In addition to transparent customization, the project also addressed inclusive collection development and modular design principles. Modular design involves creating interchangeable components or modules that can be combined in various configurations to produce a diverse range of final products. Inclusive collection development focuses on addressing body shape variations in the design process.

3.6 NICHES

"In ecology, the term "niche" describes the role an organism plays in a community. A species' niche encompasses both the physical and environmental conditions it requires (like temperature or terrain) and the interactions it has with other species (like predation or competition)" [22].

Transferring the concept of 'niche' to an apparel context aims to embrace a more specific and inclusive identification of the users than a traditional target group description. The approach is to address users bottom-up and the identification of niches is thus strictly based on collecting and analyzing extensive amounts of data about users. A niche is constituted by users with similar body-types and coherent style preferences.

*Figure 12: Illustration of potential body niches [9]*
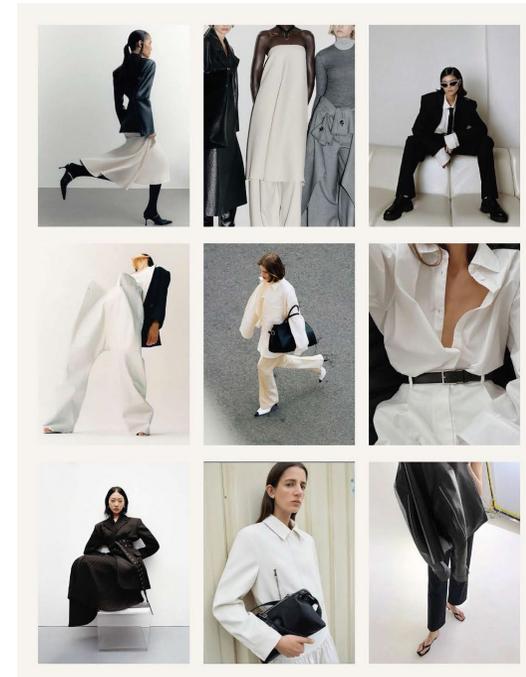
Figure 13. Illustration of style niche "Modern Monochrome", MCC Fashion 2024

4. Methodology

4. METHODOLOGY & RESEARCH DESIGN

Focusing on 'small data' that reveals real knowledge and understanding of user behavior, values, and needs is the core approach of this project. The project in no way disregards the value of statistics and big data. This type of data is included to qualify the propagation and relevance of findings when the data is available and supportive..

The two PhD projects, introduced in chapter 1, have provided inspiration for the development of the research design. The methods included in this project have thus all been tested before and have proven their applicability and relevance for

obtaining knowledge about users.

The research design for this project, visualized on the next page and elaborated on pages 24-27, illustrates the coherent approach to the overall project and includes the research process for both companies. Chapter 6, the COZE case, and Chapter 7, the SELECTED FEMME case, further elaborate on the individual process related to each case.

The research design is divided into four different levels.
Level 01 and 02 collects data to map the current situation within the contexts of the two case companies.
Level 03 focus on the analysis and identification of potentials for modifying and/or transforming the current situation.
Level 4 develops, tests and implements solutions.

4.1 RESEARCH DESIGN

Figure 14: Research Design, MCC 2024

4.1.1 RESEARCH DESIGN LEVEL 01
Background information, dialogue meetings & workshops

To obtain knowledge about the case companies, level 01 consists of a combination of desk research, dialogue meetings, and workshops.

The desk research focused on identifying the companies' product ranges and collection plans through online sources related to the companies including their own webpages and other online sales channels.

Dialogue meetings were executed online as well as in companies to obtain a deeper knowledge about the individual company. This included knowledge about structures, production facilities, design approach, aesthetic considerations, style directions, and customers.

The workshops were designed to include the project' aims and objectives, as well as addressing the specific characteristics of the two individual partner companies. Workshops included focus on identifying body types, range plan evaluations, inclusive collection planning and mass customization.
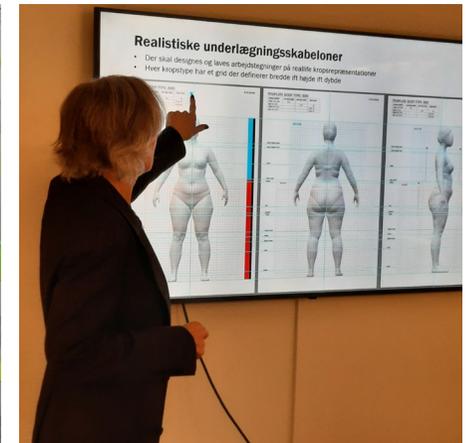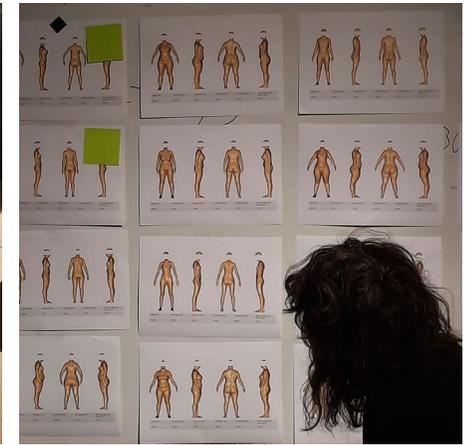
Illustration 6: Snapshots from workshops with partner companies, MCC 2023 & 2024
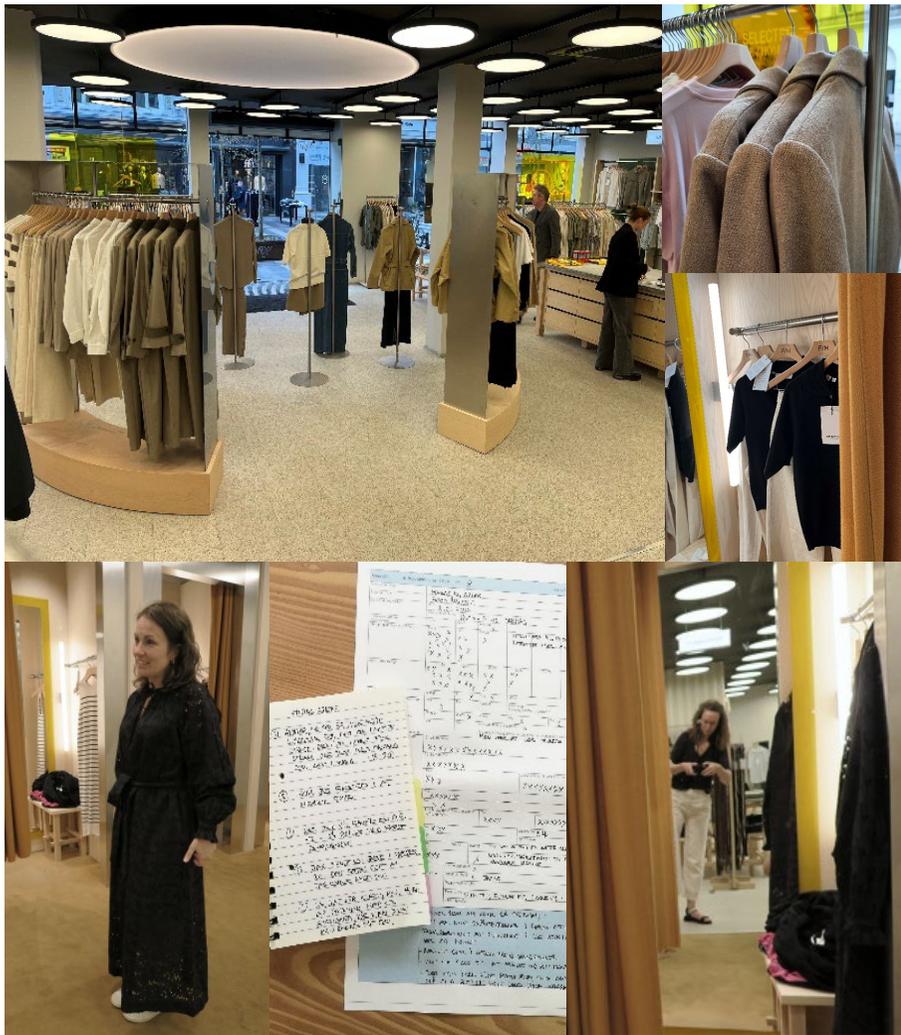
Illustration 7: Snapshots from instore observations, 2024

4.1.2. RESEARCH DESIGN LEVEL 02
User Studies
Instore observations, interviews & dialogues

In level 02, the focus was on acquiring knowledge about the companies' customers, near-customers and non-customers. Due to the deviations between the companies, level 02 included two lines of inquiry. One line of inquiry was conducted in the company's own flagship stores and the other line of inquiry in multi-brand stores.

In both cases the research included:
- instore observations using case-based developed matrixes to capture comparable datasets
- interviews, formal & informal with staff
- retrospective interviews and dialogues with customers (buying and not-buying)

Apart from the common elements, additional elements including testing and trying on products with customers and body scanning were allocated the individual cases. Findings and insight during the research process directed selection and implementation of additional elements.

4.1.3 RESEARCH DESIGN LEVEL 03
Analyzing datasets and working towards niches and needs identification

The User Centric Model (elaborated on page xx – yy) was employed to organize and analyze the collected data individually for each of the case companies' customers. For each company, data were compared to insights from research level 01, that included the companies own assumptions about their customers. Findings identified both discrepancies and similarities between the assumed customer needs and the real customer needs. Findings, thus pointed at gaps and potentials relating to fit as well as to style and design
Findings related to body type issues were compared to existing datasets [9] to qualify the quantity of identified body types facing and experiencing similar or same challenges in relation to fit and sizes. That is qualifying the percentage of Danish women likely to belong to a coherent niche.

Produkt	Antal	Kommentarer
Jeans	5	
Buksedragt	1	Også i 'denim'
Casual bukser	5	
Læderbukser	2	1 par slim fit, 1 par regular
Strikbukser	1	
Relaxed sæt	1	Pyjamas inspireret med *elastik buks + skjorte
Suits	3	2 suits bestod af samme blazer i 2 længder + 2 forskellige bukser (se foto 16),
Vest	1	Foto 15
Nederdele	8	Heraf 1 med tilhørende jakke (se foto 15)
Kjoler	7	Se skema 2 for materiale fordeling
Casual blazer	1	
Jakker	5	Heraf 1 med tilhørende nederdel (se foto 15)
Frakker	3	
Skjorter	7	
Toppe	4	Vævet metervarer
Strik (LS)	15	Langærmede & cardigans
Strik (SS)	9	Kortærmede og toppe
T-shirts (LS)	7	
T-shirts (SS)	2	
Tanktops	1	
Jersey toppe	1	

SKD:BAG	+		-	✓	
SIDESØM	+		-	✓	
LINNING	+		-	✓	
TALJE	+		-	✓	
UDDYB					
STÅENDE		+	-	✓	SIDD

UDDYB:	UDDYB:	UDDYB:

				Look- Preferencer
MATERIALE	+	-	✓	
FARVE	+	-	✓	
CUTLINES	+	-	✓	
DETALJER	+	-	✓	
LÆNGDE	+	-	✓	
VIDDE	+	-	✓	
FINISH	+	-	✓	
UDDYB				

Illustration 8: Snapshots & matrix from instore observations, 2024

Illustration 9: Snapshots from workshop focusing on body-types, 2024

4.1.5 RESEARCH DESIGN LEVEL 04
Zooming in on Concrete, Solution-Oriented Insights

The analysis phase of the research focused on identifying critical gaps between the company's current offerings and the preferences of both its core and potential customer bases. At this stage, we concentrated on these specific challenges to generate actionable, solution-oriented insights. The research examined style narratives, focusing on the evolving preferences of the target demographic, and body-related needs, particularly how variations in body shape and proportions influence product fit.

The analysis identified key areas where the company's products could be enhanced to better serve its core audience and appeal to new niche markets. These concrete insights provided a strong case for each company involved in the research to address gaps in their offerings. As part of the analysis, we also assessed the company's operational processes to evaluate how to implement changes within existing systems.

5. Interfaces, Design & Technology

5. INTERFACES. DESIGN & TECHNOLOGY

Data-Driven Product Design refers to the practice of using data insights, collected from various sources, to guide the design and development process of a product. This approach integrates relevant data into the decision-making process, enabling design teams to create products that better meet the needs and expectations of users. It emphasizes the use of quantitative and qualitative data to inform design choices, resulting in products that are targeted user niches and specific markets.

During the project timeline there has been developed several interfaces that address various perspectives related to Mass Customization for Circularity. In this section we introduce the most significant interfaces that has been the outcome of the project.

The User Centric Model (UCM), elaborated on page 29-37, has been developed as a tool to organize data and identify niches. The Data Flow Model, elaborated on page 38, is conditioned by use of the UCM and aims to raise awareness on the importance of data flows in and out

Body scanning and avatars, elaborated on page 39 focus on technologies and digital tools that can support designing for real bodies.

Inclusive collection strategies & range plans, elaborated on page 40 – 45 introduces a structure for the inclusion of more body types in the same collection.

Mass Customization, page 51, and Modular Design, page 46 -49 are introduced and demonstrated though company cases.
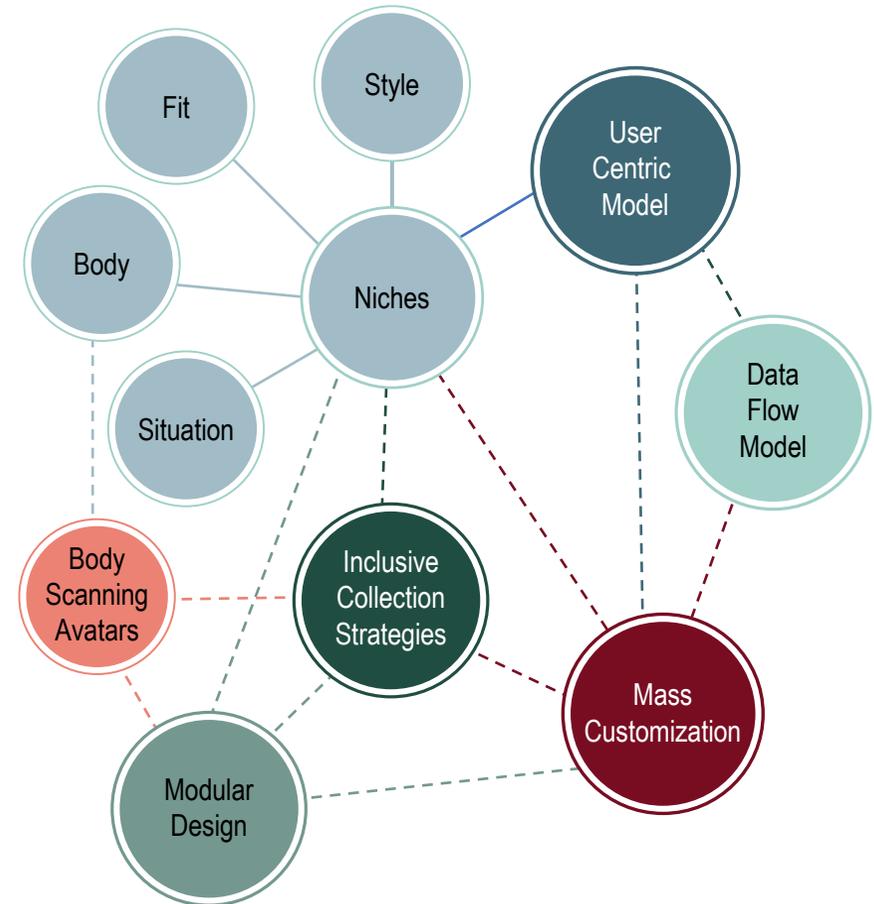
Figure 15; Interfaces and their connections; MCC Fashion 2024

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.

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.
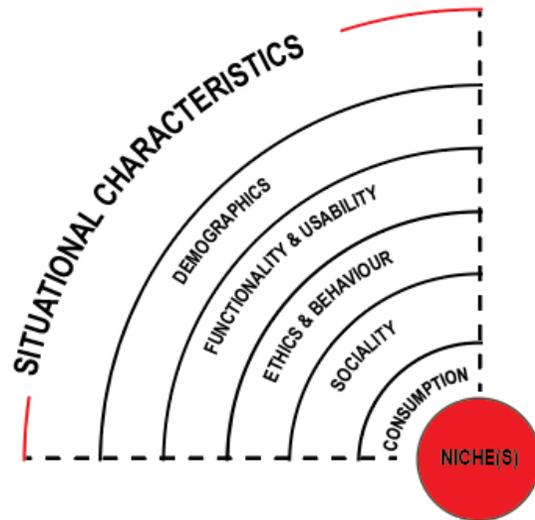

Figure 17: User Centric Model; Situational Characteristics, MCC Fashion 2024

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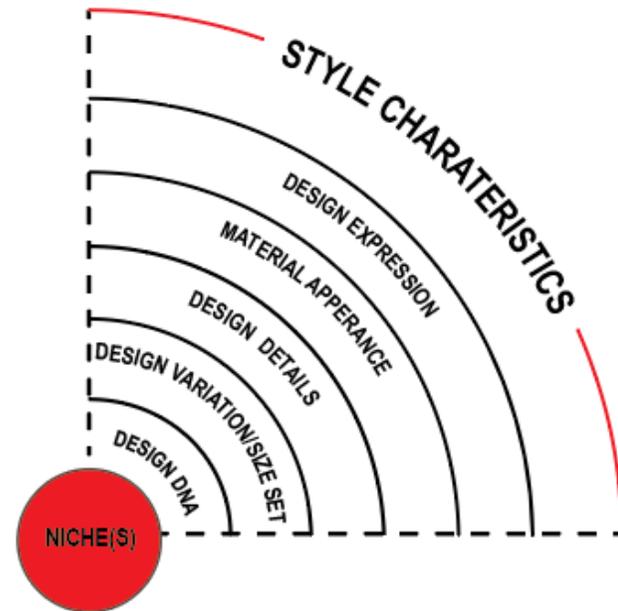
Figure 18: User Centric Model; Style Characteristics, MCC Fashion 2024

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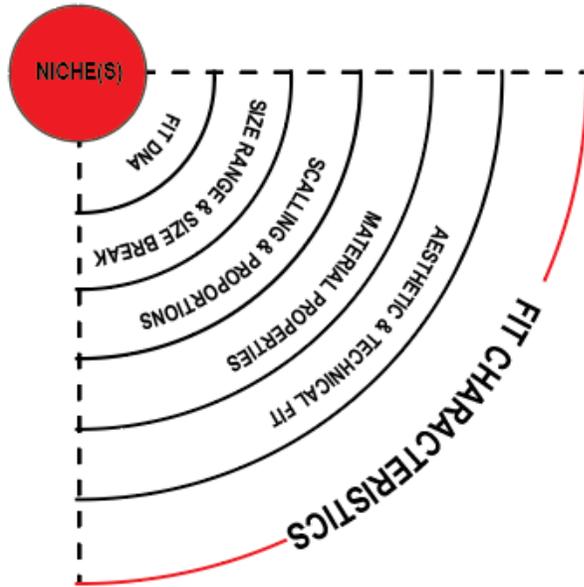
Figure 19: User Centric Model; Fit Characteristics, MCC Fashion 2024

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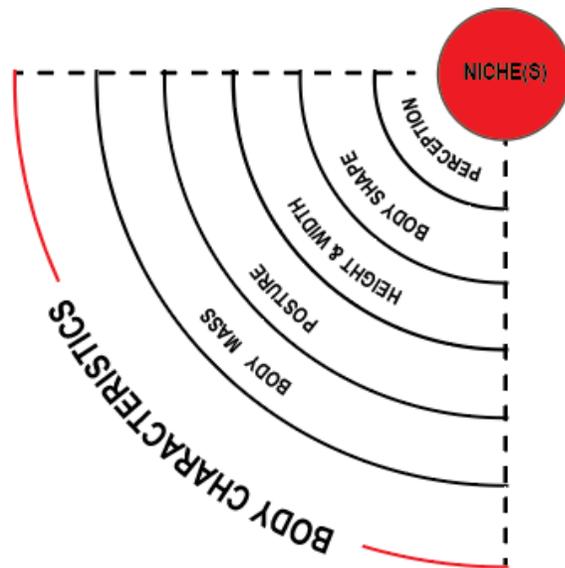
Figure 20: User Centric Model; Body Characteristics, MCC Fashion 2024

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.

5.2 DATA FLOW MODEL
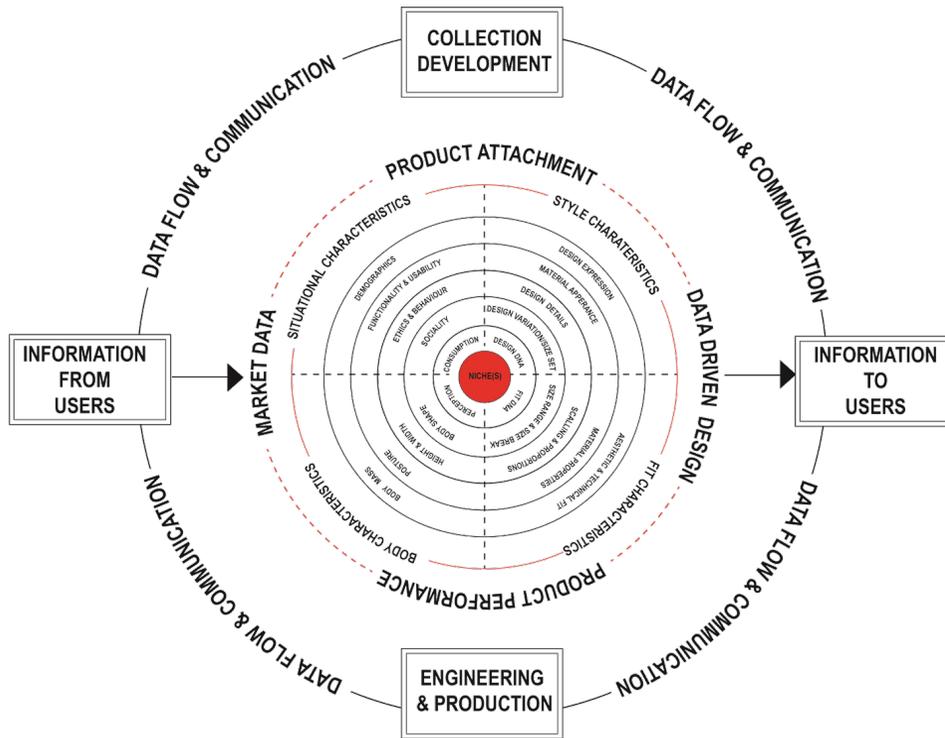
Figure 21: Dataflow model; Harsaae, Pedersen & Terkildsen, MCC 2025

The data flow model is not an operational model as such, rather it is an illustrative model that highlights the importance of securing information from users (data in) and information to users (data out).

The User Centric Model is placed at the center of the data flow model and contribute to illustrates how data flows and communication must operate between all stakeholders and is equally important on the internal and external levels.

Information from users (data in) consists of the datasets that are collected, these datasets are analyzed, filtered and clustered in the UCM-model and inform the design decisions, body analysis, strategies, etc.
The collection development, engineering, and production rely on these information to create and offer products aligned with user expectations.

Information to users (data out) relates to the communication, contents and strategies, needed to ensure that the users/customers understand the design variations they are offered and which preferences and needs the products provides. New initiatives and alterations often fail to deliver expected outcomes and live up to intentions unless they are thoroughly explained (communicated) to the envisioned and intended user.

5.3 BODY SCANNING, AVATARS & TEMPLATES

To demonstrate the use of a technological interface, companies are offered body scanning for the body types they currently use, as well as for new body types they plan to incorporate into their product offerings.

Using the Human Solutions Vitus SmartXXL3D Colour Body Scanner, an individual's body is fully scanned, and their anthropometric data is recorded. The scanned data is then transferred to an avatar, which can be used in 3D programs such as CLO 3D and for 2D analogue design development. By working with realistic avatars, designers can create design variations that reflect the proportional diversity of body shapes. This approach enables the addressing of not only standard body types but also micro-variations, allowing for targeted design solutions that move beyond the average standard. The guidelines in the 2D template represents body landmarks and aid in placement of cutlines and details. Furthermore, the scanned data is analyzed to assess the appropriate pattern construction methods and theories.
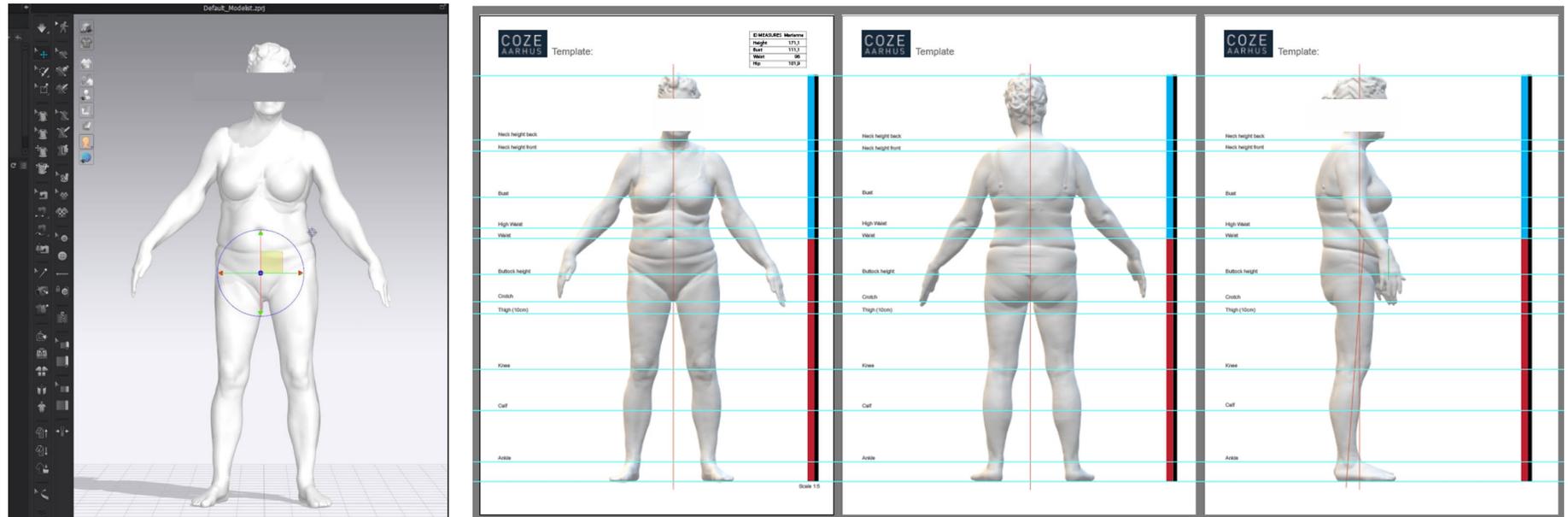
Illustration 10: Avatar templates for design development, MCC 2024.

5.4 INCLUSIVE COLLECTION STRATEGIES

Traditional collection development (CD)systems has pre-dominantly been managed in the mass-market fashion system as a portfolio of product categories divided into design variations. In mass-market, the product portfolio is mainly designed based on interpretation of trend research adapted to a brand's design DNA. In this discourse the drivers are; price level and style of fashion, often divided into categories of; base, core and profile products in an average sizing system.

In mass-market, customers are mainly predefined as an image of a mass-consumer with an average body type based on size variation using standard grading and limited fit variation in a push to market strategy. Increased demands for efficiency and standardized production have influenced the collection development process and uniformed the clothing design, size, and fit for many decades. Average body standards and proportional size grading is here the dominant design representative, and the norm applied in both the design and pattern engineering of garments. As illustrated in figure 22, a traditional collection development system represents a hierarchic and linear structure in which design management(red) is subject to the overall strategic management (green) in a push to market strategy [16].

Traditional Collection Development System

Strategic management level
- Fashion Management system
- Sales figures: turnover per product category
- Target group narratives & standard body type
- Market leading influences
- Supplier production set-up & know-how
- Price point per product category
- Market place requirements

Design management level
- DesignDNA
- Collection Plan
- Product-portfolio
- Collection & product development
- Collection evaluation
- Final Collection
- Distribution

Design research:
• Trends
• Silhouettes and details
• Style types & themes
• Product research/ inspiration
• Materials & colours
• Supplier offer samples

Rangeplan per product category:
• Base
• Core
• Profile

Design development:
• Sketching
• Sourcing
• Style/design specifications
• Technical documentation
• Standard fit, size & grading

Sampling process:
• Supplier/maker communication
• Fit & size system
• Physical/3D prototypes

Sample testing/ redesign:
• Internal selection of styles for collection

Scale & development of collections and sales materials (physcial and/or digital)

B2B / B2C (physical & on-line)

Push Strategy: standard products

Figure 22: Illustration of a traditional collection development system [16]

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Traditional collection development w/standard fit & grading

Figure 23 illustrates a traditional approach to collection development based on a given brand's chosen standard body type. The product portfolio represents 6 product categories each representing a number of designs, silhouettes and style variations distributed in a range plan of 92 styles in total (marked with black dots).

STANDARD DESIGN RANGE PLAN

Bodytype **Standard =** average bodytype: (match 8,8-12,8%)

PRODUCT CATEGORY	PRODUCT VARIANT	Bodytype STANDARD	STYLES	TOTAL
TOPS	Sweat Shirts	● ● ● ● ●	5	
	T-Shirts	● ● ● ● ●	5	
	Shirts	● ● ● ● ●	5	
	Tunics/blouses	● ● ● ● ●	5	
	Knit	● ● ● ● ●	5	25
TROUSERS	Volume	● ● ● ●	4	
	Straight	● ● ● ●	4	
	Relaxed	● ● ● ● ●	5	
	Jeans	● ● ● ● ●	5	
	Shorts	● ●	2	20
DRESSES	Bodycon	● ● ● ● ●	5	
	Volume	● ● ● ● ●	5	
	Regular	● ● ● ● ●	5	15
SKIRTS	Volume	● ● ● ●	4	
	A-line	● ● ● ●	4	
	Straight	● ● ● ●	4	12
BLAZERS/JACKETS	Formal	● ● ●	3	
	Casual	● ● ● ●	4	
	Functional	● ● ●	3	10
OUTERWEAR	Formal	● ● ● ●	4	
	Casual	● ● ● ●	4	
	Functional	● ●	2	10
				92

Figure 23: Illustration of a traditional collection development with standard fit and grading [16]

Research project To Fit in

The research demonstrates that among the respondents only between 8,8-12,8% match current standards [9] consequently, more than 50% of the interviewed participants express having to accept certain design and fit compromises thus influencing product performance and reduced lifespan (ibid). It can thus be argued that traditional collection development based on average standard body types and fictive personas results in reduced product performance, to reduced product satisfaction and use times, which ultimately leads to fast and frequent product replacements. Consequently, the traditional collection development approach is contributing to the fashion industry's devastating environmental impact.

Our hypothesis is that by implementing a collection development approach that includes different body types, we can contribute to increased consumer satisfaction and reduced environmental impact.

Inclusive Collection Development with three fit & design variations & aesthetic grading.

Taking a different approach towards improving CD, we adapt a more inclusive design and fit discourse by addressing the three most prominent shape categories identified in the study [9]. The shapes are: "x" moderate hourglass body type, "BX" bottom hourglass and "BXD/(xD)" bottom hourglass with a significant abdomen waist measure. As illustrated in figure 24, the number of product categories (6) and styles (92) remains status quo compared to figure 23. However, this system represents variations in each category aimed at specific body types. Each body type has a colour code, and where a design variation conforms to more than one body type, two or three colours are applied.

We apply the condition that it is a design responsibility to create design variations that aesthetically and functionally compliment body variations. This includes designing on real body types in a full-size range. Silhouette, line flow and scale of details should complement any given body type and size in a balanced and harmonic expression implemented in the aesthetic grading system. This strategy requires a system of multiple body type related basic patterns extending from offering designs in size variations to offering variations based on shape, size, and aesthetic design assessment in a full size-range. In this strategy, design effort and energy are invested in product portfolio management by integrating variations of body types in a cross-disciplinary structure. By comparing the two collection development figures 23 and 24, it is evident that the level of complexity is raised in the latter model. However, by addressing design and fit variations in a combination, the fit performance can be improved from 12.8 to 71.8 % [9]. If we are to rethink collection development based on the premises of reducing overproduction, it is imperative that we restrict the product portfolio to contain less but targeted styles. Addressing this challenge, we suggest a product portfolio model based on a curated collection development strategy as will be elaborated in the following section

INCLUSIVE DESIGN RANGE PLAN W/ TARGETED DESIGNS

Bodytype **x** = moderate hourglass (match 37%)
Bodytype **BX** = bottom hourglass (match 18,4%)
Bodytype **BXD+xD** = bottom hourglass & extended depth + moderate hourglass & extended depth (match 16,4%)

PRODUCT CATEGORY	PRODUCT DESIGN	Bodytype x / Bodytype BX / Bodytype BXD+xD	x	x BX	BX	BX BXD+xD	BXD+xD	STYLES	TOTAL
TOPS	Sweat Shirts	◉	●		●		●	4	
	T-Shirts	◉	●		●		●	4	
	Shirts	◉	●		●		●	4	
	Tunics/blouses	◉ ◉	●		●		●	5	
	Knit	◉ ◉	●		●		●	5	27
TROUSERS	Volume		●	◉	●		● ●	5	
	Straight		● ●		● ●		● ●	6	
	Relaxed	◉	● ●		●	◉	●	6	
	Jeans		● ● ●		● ● ●		● ●	8	
	Shorts		●	◉				2	27
DRESSES	Bodycon		● ●		● ●		●	5	
	Volume	◉ ◉		◉		◉		4	
	Regular		● ●	◉	●	◉	●	6	15
SKIRTS	Volume	◉	●		●		●	4	
	A-line			◉			●	2	
	Straight		● ●		●	◉	●	5	11
BLAZERS/JACKETS	Formal bodycon		●	◉	●		● ●	5	
	Casual loose	◉	●			◉		3	
	Functional	◉		◉				2	10
OUTERWEAR	Formal		●		●		●	3	
	Casual	◉		◉			●	3	
	Functional	◉						1	7
		15	24	8	19	5	21		92
	Targeted Design options		15+24+8		15+19+13		15+21+5		

Figure 24: Illustration of extended collection development with three fit and design variations [16]

Curated Collection Development with seven variations & aesthetic grading

Curated collection development (niche collection) involves catering to a specific target audience with a specialized offering that differentiates itself from the standardised market. Both in retail and online shopping, the customers report having to search for information and needing guidance to make informed buying decisions [9] . The curated collection development, illustrated in model 24, is created with the aim of building a yearly wardrobe for customers sharing style preferences within a brand's design DNA. The product portfolio is divided into six product categories designed and engineered based on real "Body & Mind Profiles" in contrast to fictive personas and average body types.

In the illustrated example, figure 23, the main collection consists of 44 styles designed for body type "x" = moderate hourglass, representing 37% of the scanned women from the study [9] (red squares). In order to offer the same style and quality to multiple body types, we evaluate the individual product design performance on a variation of body types. Not all styles will be suitable for all body types, the designer will conduct an aesthetic style evaluation of the main collection, and curate which styles can be altered to provide flattering alternatives within the design DNA and style expression to match customers' bodily variations.
This means that the designer applies aesthetical design alterations to compliment specific body types.

The squares in different colours illustrate the interpretation of the design DNA and style expression to match bodily variation (here represented by BX + BXD + λD) and share the characteristics of a significant lower body volume compared to upper. In total, they represent 34% of the scanned women (dark green squares with red frame).

Finally, aesthetical design alterations aimed at body types xD+H+HD all sharing the characteristics of having an almost equal upper and hip volume here represent in total 14.7% (light green squares with red frame). To reach the highest product performance possible, the curated collection development model also integrates aesthetic grading as a parameter. In this system, we cater to a total span of body variations with a fit performance of almost 85.7% [9]. We need to acknowledge that in order for designs to flatter the body, body variations and sizes must be addressed in the design and make process. Incorporating new collection development strategies, points to alternative Fashion Management Systems.

CURATED DESIGN RANGE PLAN W/ MULTIPLE FIT VARIATIONS & AESTHETIC DESIGN/SIZE GRADING

Bodytype **x**
Bodytype **xD + H + HD**
Bodytype **BXD + BX + λD**

PRODUCT CATEGORY	PRODUCT DESIGN	x	xD + H + HD	BXD + BX + λD	STYLES + VARIATIONS	TOTAL
TOPS	Sweat Shirts	■ ■	▫ ▫	■ ■	2 + (4)	
	T-Shirts	■ ■ ■ ■ ■	▫ ▫ ▫	■ ■ ■	5 + (6)	
	Shirts	■ ■ ■	▫ ▫	■ ■	3 + (4)	
	Tunics/blouses	■ ■	▫ ▫	■ ■	2 + (4)	
	Knit	■ ■	▫ ▫	■ ■	2 + (4)	**14 + 11 + 11**
TROUSERS	Volume	■ ■	▫ ▫	■ ■	2 + (4)	
	Straight	■ ■	▫ ▫	■ ■	2 + (4)	
	Relaxed	■ ■	▫	■	2 + (2)	
	Jeans	■ ■ ■	▫ ▫	■ ■	3 + (4)	
	Shorts	■	▫	■	1 + (2)	**10 + 8 + 8**
DRESSES	Bodycon	■ ■	▫ ▫	■ ■	2 + (4)	
	Volume	■ ■	▫	■	2 + (2)	
	Regular	■ ■	▫ ▫	■ ■	2 + (4)	**6 + 5 + 5**
SKIRTS	Volume	■ ■	▫	■	2 + (2)	
	A-line	■ ■	▫ ▫	■ ■	2 + (4)	
	Straight	■ ■	▫ ▫	■ ■	2 + (4)	**6 + 5 + 5**
BLAZERS/JACKETS	Formal bodycon	■ ■	▫ ▫	■ ■	2 + (4)	
	Casual loose	■ ■	▫	■	2 + (2)	
	Functional	■	▫	■	1 + (2)	**5 + 4 + 4**
OUTERWEAR	Formal	■	▫	■	1 + (2)	
	Casual	■	▫	■	1 + (2)	
	Functional	■	▫	■	1 + (2)	**3 + 3 + 3**
	Curated Range	**44**				**TOTAL 44 +** (72)
	Fit variations & aesthtic design/sixe grade		36	36		

Figure 25: Curated collection development w/seven fits and aesthetic grading: source [16]

The different Inclusive and curated range plans are only examples of how the collection development strategies can be developed, every brand will have to make their individual interpretation of the inclusive strategy matching their inclusive ambitions.

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5.5 MODULAR DESIGN

Modular design addresses variation potentials within the product range.

Modular design provides the foundation for offering variations of mass customization and focus on constructing and building a system that enables a customer to choose between a variation of fits, shapes and design elements to construct the style they prefer e.g., choosing a specific collar and/or sleeve shape for a dress or choosing additional bust width.

Modular design can be used as a tool to structure the product range and create systems internally. This means that the customers are not participating in choosing between the different elements but are faced with a range of offerings aligned with their need and preferences, identified though data collection and analysis.

SELECTED FEMME has addressed modular design with a specific focus on dresses and has initiated the building of a system that includes an additional body type added to their already offered body type and similarly comprises the incorporation of design details that can be transferred between clothing products.
As part of the project, they have developed an overview (Modular Design Matrix illustrations page 11-13) aimed at the amount of shirt dresses in their coming SS26 collection.
The system can be built on pattern codes/identities for the individual modules that can be communicated across design, pattern makers, and suppliers to secure identical communication in the production set-up and to create a data feedback system for building a mass customization platform.

Cuffs

Illustration 11: Research for SELECTED, inspiration for modular design.

5.5 MODULAR DESIGN

SHIRT DRESSES FRAME

DRESS SHAPE	BODY TYPE	COLLAR	SLEEVE/ CUFF	POCKET	DETAILS	FABRIC	TRIM
	A-SHAPE EXTRA BUST 	 MANDARIN COLLAR % BINDING	 SHORT SLEEVE WITH CONTRAST FOLD-UP	+ SIDE POCKET	 HALF PLACKET	COTTON POPLIN	
	REGULAR STRAIGHT EXTRA BUST 	 MANDARIN COLLAR	BOXY SHORT SLEEVE 	 + SIDE POCKET	 TOPSTITCHING	COTTON + EMBROIDERY 	

Illustration 12: SELECTED FEMME, Modular design (SELECTED FEMME, 2025)

5.5 MODULAR DESIGN

SHIRT DRESSES FRAME

DRESS SHAPE	BODY TYPE	COLLAR	SLEEVE/ CUFF	POCKET	DETAILS	FABRIC	TRIM
	LOSE/ OVERSIZE MODERATE HOURGLASS	FLAT COLLAR NO COLLAR STAND	WIDE 3/4 SLEEVE		TOPSTITCHING SLIT	COTTON POPLIN	
	OCCASION FIT + FLARE OR A-SHAPE EXTRA BUST		NO SLEEVE	HIDDEN POCKET IN SIDE SEAM		TENCEL VISCOSE ACETATE	
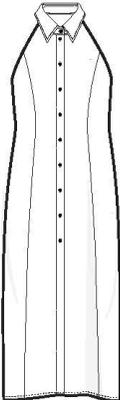
Illustration 13: SELECTED FEMME, Modular design (SELECTED FEMME, 2025)

5.5 MODULAR DESIGN

SHIRT DRESSES FRAME

DRESS SHAPE	BODY TYPE	COLLAR	SLEEVE/ CUFF	POCKET	DETAILS	FABRIC	TRIM
	OVERSIZE REG SHOULDER EXTRA BUST 			HIDDEN POCKET IN SIDE SEAM	 GATHERS	COTTON VOILE	 BLACK

Illustration 14: SELECTED FEMME, Modular design (SELECTED FEMME, 2025)

½ Raglan

Mix & Match

½ Raglan

Pocket variants

50

Lapel
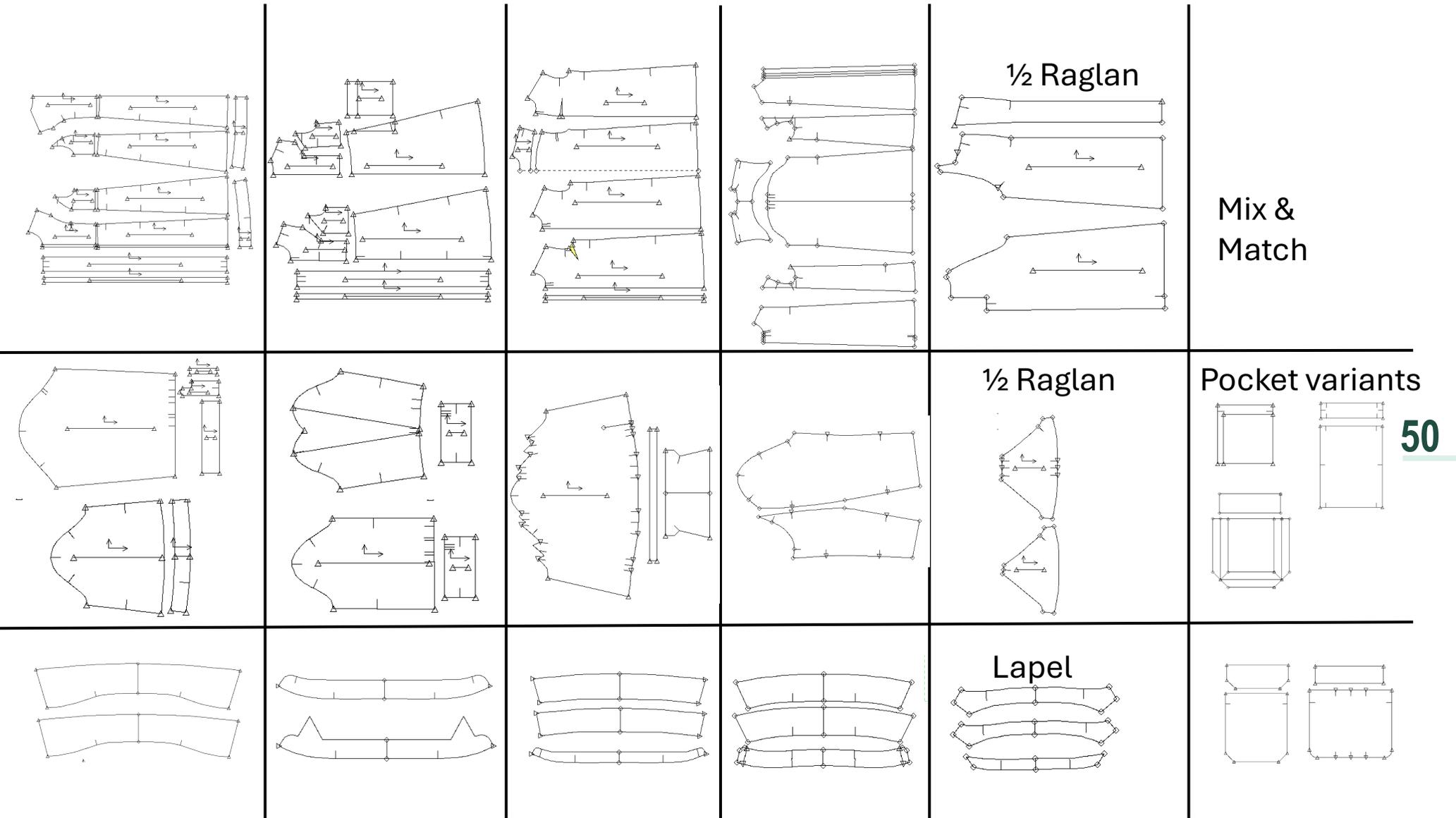
Illustration 15: Pattern development, modular design, MCC, 2024.

5.6 MASS CUSTOMIZATION

An important element in a mass customization strategy is deciding to which extend the customers are involved in the process (co-creating) or not involved at all, and subsequently to develop the suitable communication channels and lines.

The two partner companies have both embarked on mass customization, but with different approaches. The previous section illustrated how SELECTED FEMME has worked with modular design to provide their customers with customized options that cater to different body types.

COZE has worked with a co-creation approach that allows customers to make individual decisions related to their body type and design preferences. COZE has initially decided to offer trousers based on three different body types, i.e., three micro-standards, that customers can choose from. Subsequently, they have decided which design elements they will offer their customers. The number of variations may increase as the company establishes and expands its systems with suppliers and partners. COZE has worked on developing a customer journey that engages their customers in the design and decision-making process. (Illustration 16 –33)
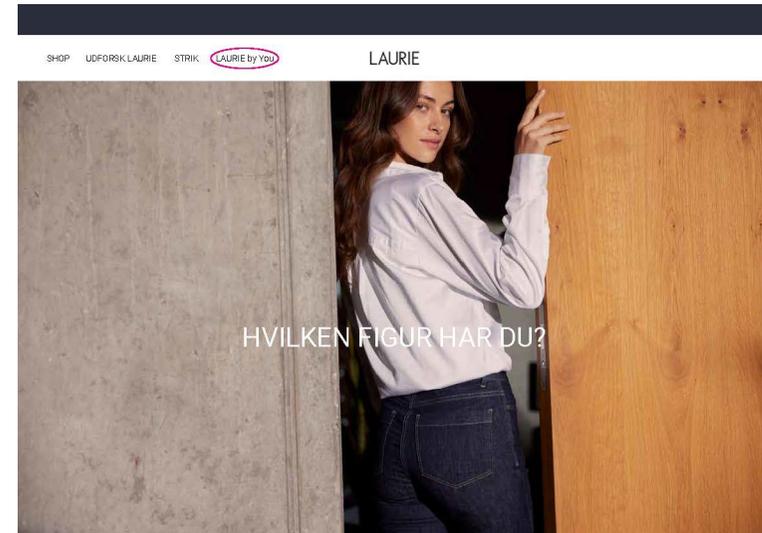
Illustration 16: Landing page for COZE customer journey (COZE, 2025)
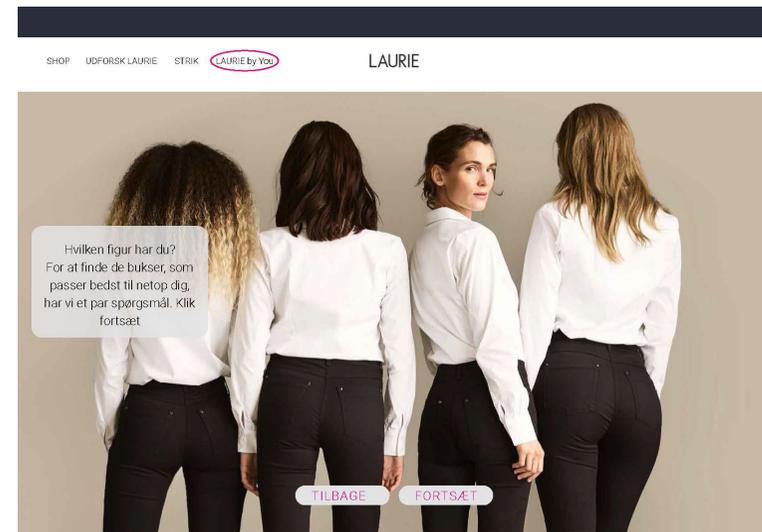
Illustration 17: Page 2, COZE customer journey (COZE, 2025)

6. Company case; COZE

7. COMPANY CASE: COZE

The presentation of the company, COZE, is structured around the research phases implemented in their specific case, visualized in the research design (figure 25).

BACKGROUND, DIALOGUE MEETINGS & WORKSHOPS
The initial phase of the research aimed to gather insights into COZE's operations and understand the company's structure and processes. Through a combination of online research, dialogue sessions, and workshops with the CEO, designer, and pattern maker, the project/MCC team systematically collected data to familiarize themselves with COZE's operations. Additionally, the workshops served to introduce the COZE team to diverse perspectives on mass customization and the development of inclusive collection and product range.

Our story
Founded in 1987, COZE AARHUS is built on a foundation of contemporary design, an excellent fit and propriety. Sustainable growth and responsibility continue to be the basic conditions of our further journey towards a more responsible fashion industy.

With more than 30 years in the fashion industry, we have learned that there are always ways to do better.
We believe that a heavy focus on sustainability should go hand in hand with fashion production, and we are constantly improving the way we make products, work with suppliers and educate our staff
At COZE AARHUS, we make decisions with an equal emphasis on people, the environment and the economy. And every decision has got to feel right. That is corporate responsibility to us.
Everything that we produce has an environmental and social impact, and we still have a long journey ahead of us. While we recognize that a piece of our clothing cannot change the world, we believe that it's a good place to start.
Our portfolio currently consists of the brand LAURIE that offers women's clothing with a particular focus on trousers.

Illustration 34: From COZE's own website, March 2025. https://cozeaarhus.dk/
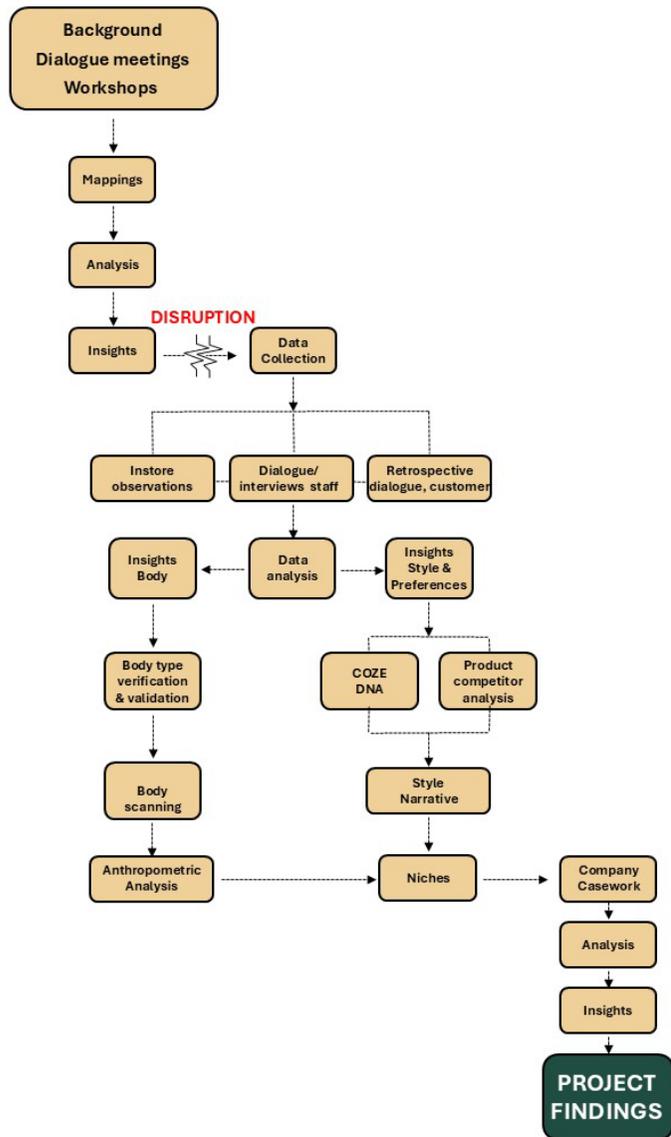
Figure 26: Research design company case COZE, MCC Fashion 2024

7.1.MAPPING, ANALYSIS, INSIGHTS & DISRUPTION

The mapping and analysis of the collected data revealed that the company did not own the production facilities required to fully implement a mass customization strategy. This limitation disrupted the process, highlighting the company's reliance on third-party partners for execution. However, there was a solid foundation and a strong willingness to integrate user data into the design process, enabling transparent customization strategies.

7.2.DATACOLLECTION

The data collection involved in-store observations, staff dialogues, and retrospective interviews with customers at three multi-brand stores in medium-sized cities in Jutland. The primary objective of the in-store observations was to identify customer pain points and gains, thereby revealing potential market gaps. These observations and dialogues were conducted in the spring of 2024.

The data analysis followed two distinct paths, which were subsequently integrated into specific COZE style niches. One path focused on customer body characteristics, while the other examined style preferences. The results of the analysis were incorporated into the existing dataset (anthropometric data) to assess the market significance of the gap. Additionally, the analysis identified primary competitors and customer niches, along with the reasons behind purchase or rejection decisions. Conversations with sales staff provided valuable insights into everyday practices and the segments they were unable to optimally service within the current product assortment.

MCC FASHION

Mass Customization for Circularity

COZE
AARHUS

NICHES

Observations & Competitor analysis Spring 2024

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IN STORE OBSERVATIONS

In-store observations involve systematically and directly observing individuals' behaviors, interactions, and activities within a retail environment. It also involves paying attention to how customers perceive products, whether they can find what they are looking for, and identifying pain points (frustrations) or gains (positive experiences) during the shopping process.

In the case of COZE, the observations focused on how their products were perceived and how they performed compared to competing brands. The design team at COZE recognized that fit and comfort played a critical role in shaping the perception of their products. While COZE primarily targets a single body form and uses linear grading, the brand relies on materials with a high stretch percentage to offer a more suitable fit across different body shape variants. Part of the observations involved testing this assumption to assess its effectiveness in real-world conditions. Additionally, we aimed to identify COZE's primary customers, potential customers, and groups with little or no interest in the brand, gathering their feedback on both the brand and its products. After concluding the observations, we engaged with the salespeople to gain their perspective on the brand in general and the observations that were made. All three visited stores had highly experienced sales staff, and evaluating the results in conjunction with their expertise further validated our findings. As COZE places significant emphasis on ensuring their products meet sustainability standards, we also focused on whether customers perceive sustainability as a key purchasing factor. Our research aimed to understand how important sustainability is in the decision-making process for customers and whether it influences their perception of the brand and their willingness to make a purchase.

The in-store observations were complemented by retrospective interviews, meaning that we first observed customers from a distance, carefully recording their actions and behaviors. Afterward, we reached out to them to gather insights into their reasoning behind these actions. This approach allowed us to connect observed behaviors with the customers' own perspectives, providing a deeper understanding of their decision-making processes and motivations during their shopping experience.

Illustration X. Snapshots from observation, Spring 2024. MCC

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IN STORE OBSERVATIONS – PRIMARY FINDINGS TO BE ADDRESSED

Niche Variants: Customers desire more design details.
The observational studies revealed that COZE is well-known for the comfort of its materials. However, it was often not the first choice, as many customers were drawn to trousers with more design details. As one customer expressed,

"I think some of the competing brands are a bit smarter, so if they fit well, I would probably choose them, but I really like COZE trousers because they are comfortable."
Customer, Age 62.

"We are often the ones who recommend COZE trousers because we know they are comfortable. However, they are not always the customers' first choice, as they often choose based on design details."
Sales assistent from Ringkøbing.

These comments prompted the need for a competitor analysis with a specific focus on design details.

Specific Body Shapes Not Addressed:
Observations of customers trying on trousers, along with feedback shared with sales staff, revealed that a particular body shape struggles to find trousers that fit—not only from COZE but in general. Customers were particularly frustrated with the thigh and waist proportions and the excess fabric around the thighs.

This issue was subsequently discussed with the sales staff, who agreed that it is a real problem and highlighted a gap in the market. This insight led to a request for an analysis of anthropometric data to assess the extent of the gap.
Analysis of body characteristics established a specific body shape currently not adequately represented in the product assortment.

Design Critique on Size Range

Ease Evaluation:: The analysis highlighted the need for a reevaluation of the design ease, as one customer pointed out that being a size 48 in trousers doesn't equate to being a size 45 in shoes. She specifically referred to the leg width, noting that too much ease in the trousers made her appear squared, detracting from the fit and overall appearance. This feedback emphasizes the importance of tailoring the design ease to avoid a disproportionate or overly loose fit, particularly in the leg area.

Sustainability:

Unfortunately, sustainability was not a primary priority for customers, a point further confirmed by the sales staff. However, when discussing sustainability with customers, they generally expected Danish companies to live up to their responsibilities. Additionally, customers were unable to differentiate between various certification systems and expressed confusion about the provided information. Similarly, they showed little confidence in sizing, particularly when comparing brands, and stated a preference for trying on garments before making a purchase.

ADVANTAGES

COZE products are highlighted for their comfort

COZE has loyal customers who buy the products because they are comfortable to wear

COZE distances itself significantly from low-cost brands

COZE offers pants in different lengths that can be ordered with short delivery times

COZE has a good model guide

The staff are happy with COZE and highlight good service

Customers who know COZE are happy with them

"...they have a really good service and a good range.

We would recommend COZE because it is a good product with very few complaints"

[Sales assistant]

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CHALLENGES

Competitors offer more design details, including print & colors at a lower or the same price

Competitors offer the same types of certifications

Certifications are not important to customers

Customers know Laurie and not COZE

Model guide (COZE) is not updated

Competitors immediately attract more customers

"I just thought they were a little smarter, with a little more nice details. I've also bought Laurie before, which I've been very happy with, but today I thought brand XX was a little smarter, they also have better colors"
[Customer, 60-65 years old, chooses XX over Laurie]

"… they must be careful that the price level does not become too high compared to their competitors"
[Sales assistent]

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POTENTIALS

Fit variations – not all customers can't find trousers that fit their body type

A specific body type has been identified that is currently not catered to in the market.

"… they are otherwise really nice (Laurie pants), but there is too much fluff on the back of the thighs,

I can't really accept that"

[Local customer, 65-70 years old, tries several models in sizes 38 & 40]

"… it's a really nice material, but I become completely square,

there is way too much fabric in the back"

[Tourist, 59 years old, tries Laurie shorts in size 50]

STYLE NARRATIVE

VISUAL COMPETITOR ANALYSIS

The mood boards present the style narratives identified in the competing brands' spring/summer 2024.

Competitor names not revealed here.

STYLE NICHES

Based on the competitor analysis, 9 different style niches have been identified. The need for the number of style niches must be assessed in relation to COZE's Design DNA and the situational characteristics accommodating users' needs and preferences. Style niches must be evaluated in relation to body types and how many style niches you want to offer as part of your collection building strategy and which design elements can be advantageously offered as Mass Customization.

Which design elements can work on multiple body types and which design elements should be differentiated?

DETAILS INSPIRATION

Based on the competitor analysis and the statements from customers/potential customers as well as sales staff, it has been identified that both inspiration themes, style narratives and design details are important parameters for customers' choices.

As part of the project inspirational design detail boards were developed by the MCC team to start the initial design dialogue with COZE.

The following pages present the inspiration for various design details. Applied trim and details contribute to brand identity but must of course also be assessed in a sustainable context.

Based on comparison of design details in the current COZE product range, it can be recommended to integrate more design detail variations in the future to address the requests in the market.

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Details Embroidery

Front Pocket

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Back Pocket

Print Details

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Straps
Details

Other
Details

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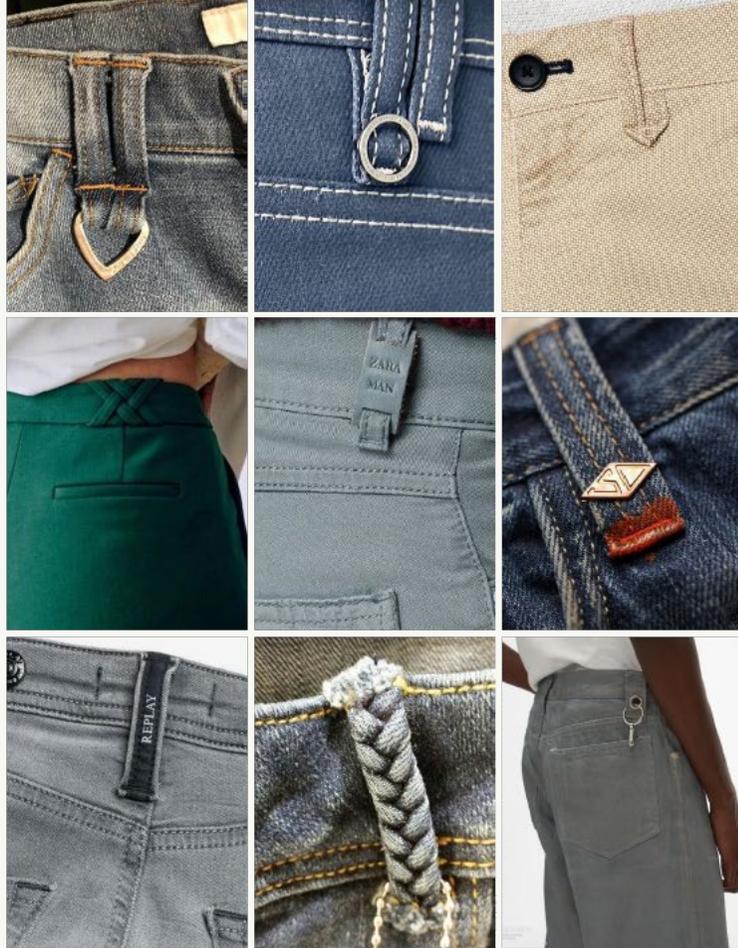
Cutline
Details

Details

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Jacquard Denim

COZE
AARHUS

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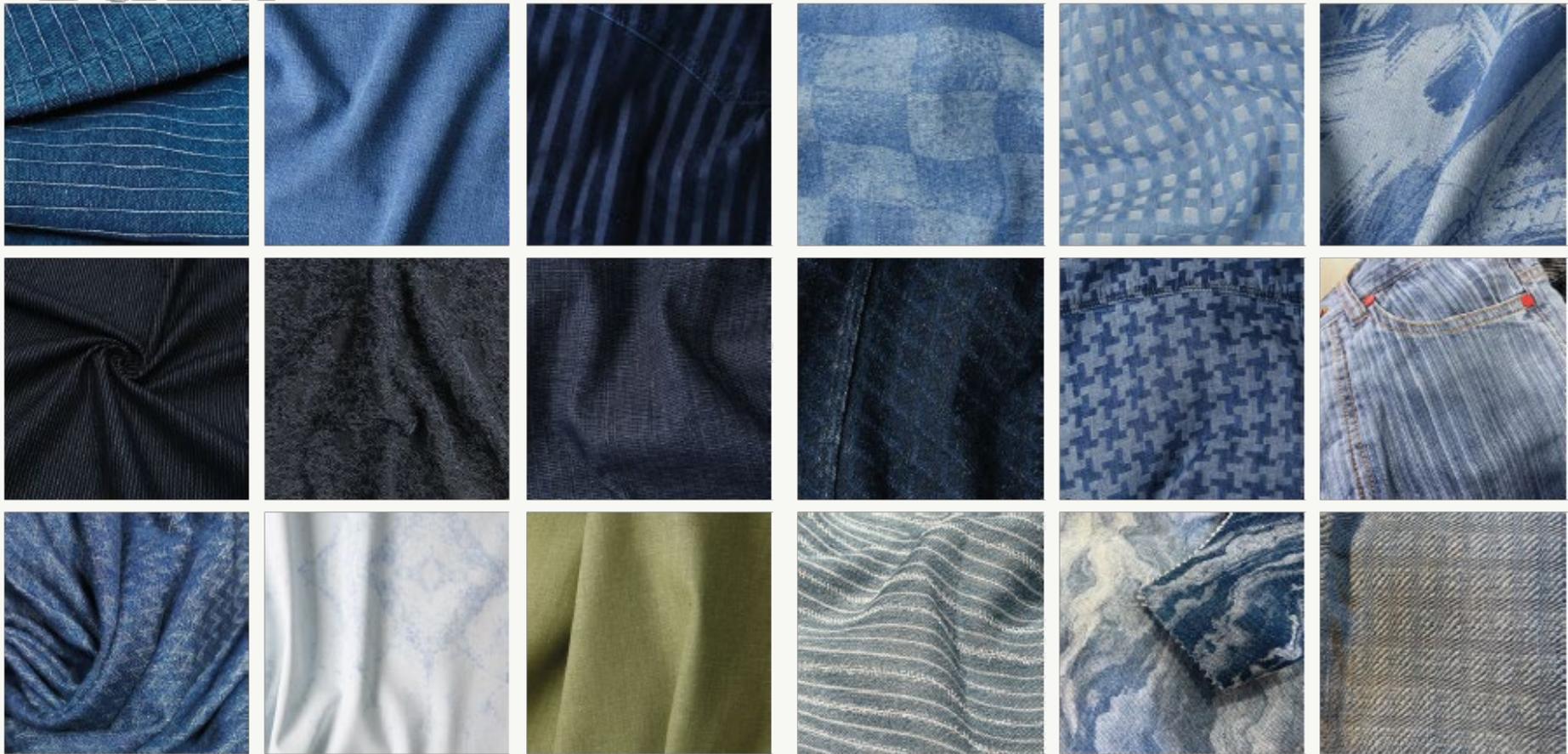
BODY SCANNING & TEMPLATE DEVELOPMENT

COZE scanned four distinct body shape variants. These variants were converted into avatars and subjected to numerical analysis to inform construction theory and methods. Due to software limitations, the figure variant could not be created as a parametric avatar in CLO, so the scanned avatars were imported into the software. Additionally, 2D templates were created for design sketching, reflecting real-life proportions. Building on previous findings, which identified a specific body shape variant (M) as a key concern, this variant was selected as the project's test example.
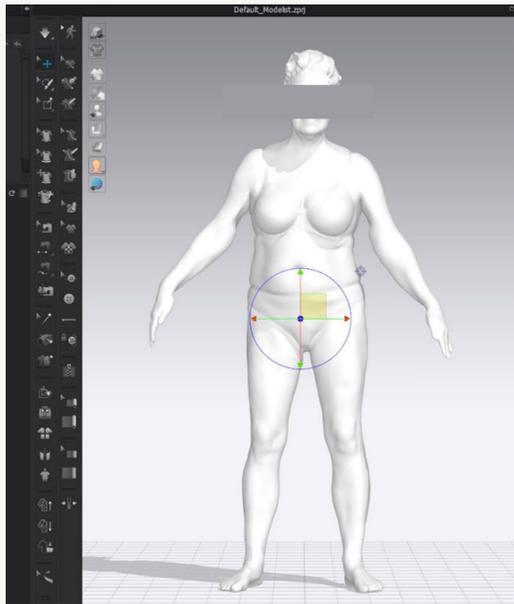
Template, K
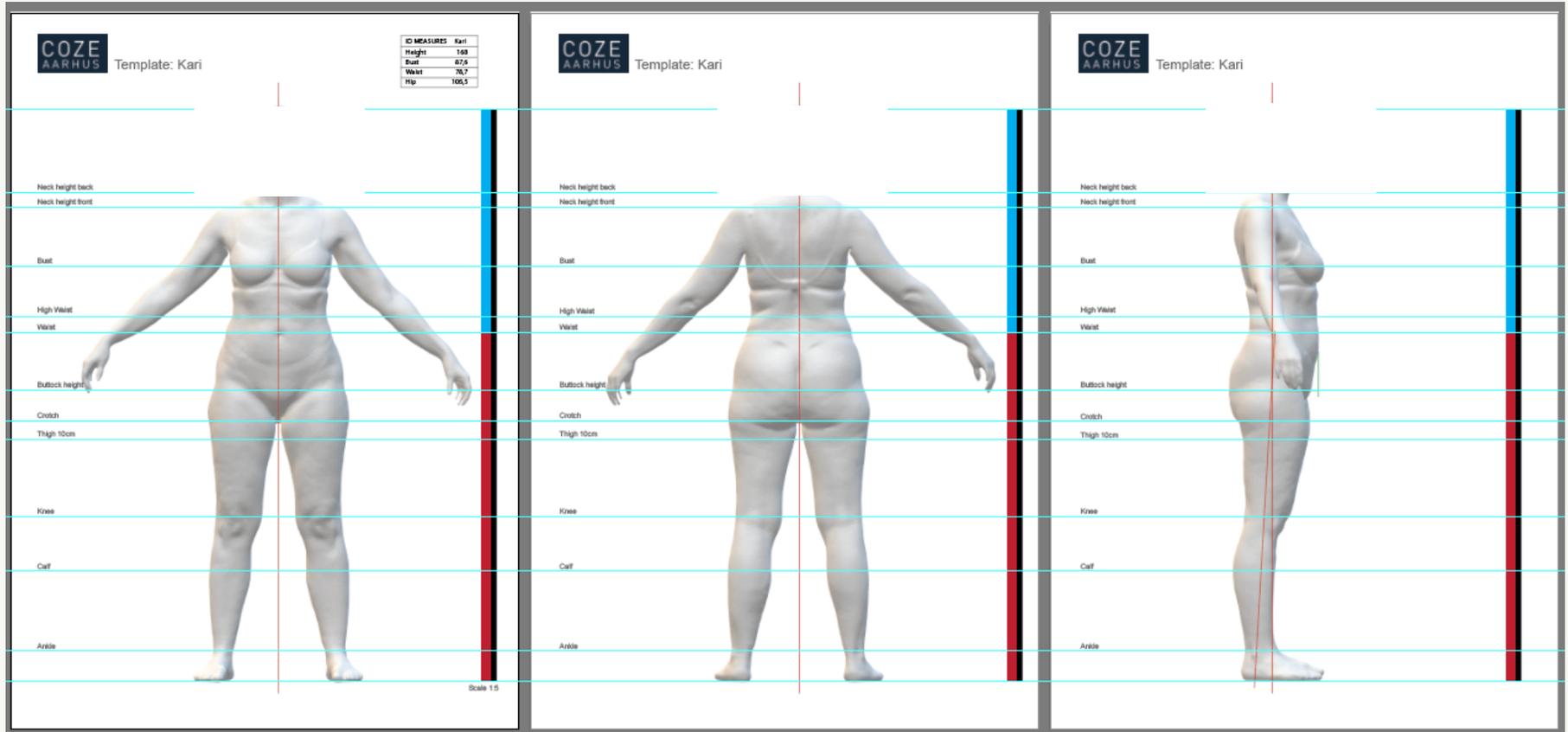
Template, S

70
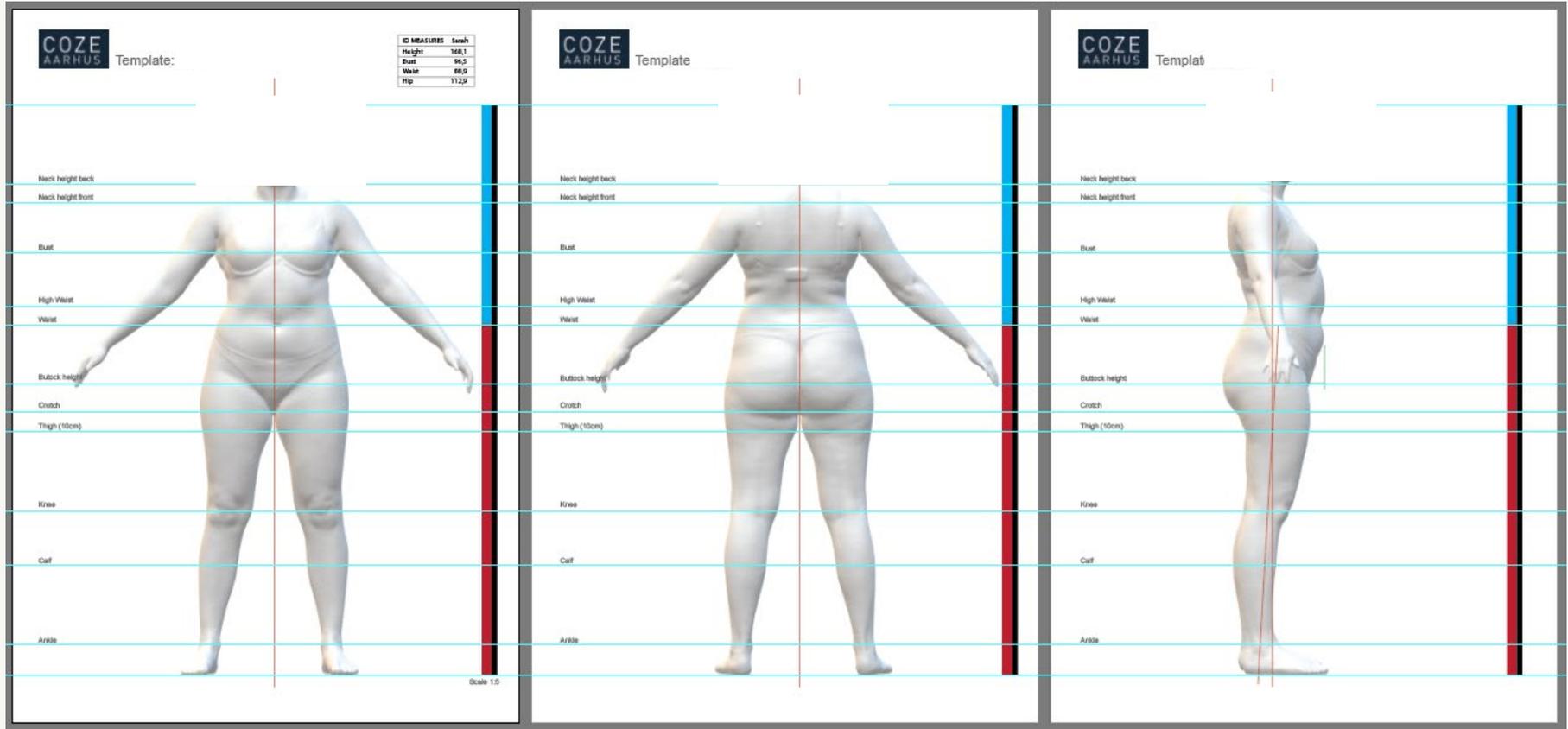
Template, M

Template, L

Transparent Customization.

Transparent customizers fulfill the needs of individual customers in an indiscernible way - changing the product for them but in such a way that they may not even know that the product has been customized. Instead of requiring customers to take the time to describe their needs, transparent customizers observe behaviors over time, looking for predictable preferences
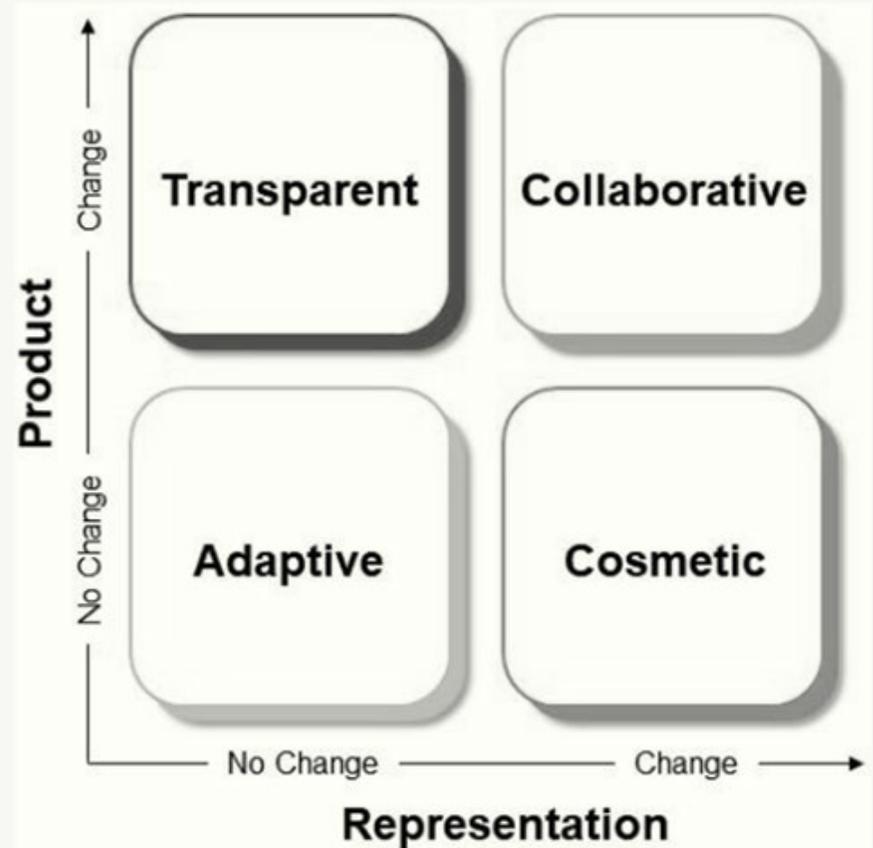
DATA DRIVEN FIT & SIZING
HOLE IN THE MARKET - MARKET IN THE HOLE

As a starting point, Betina (Pattern Designer) at COZE requested various patterns from the supplier to be analyzed with respect to silhouette and size break intervals. It was concluded that the current models did not adequately support the specific body variant in question.

A visual analysis of body scan avatars (based on an anthropometric data set of n=450 Danish women aged 18-77) was conducted. In the visual analysis, both the front and side views of the body forms were carefully compared to the body shapes observed during the in-store observations. This comparison led to the identification of 44 avatars that closely matched the body shape profiles identified in the observational phase. These 44 avatars were then subjected to a detailed numerical and proportional analysis.

Id	Value	S
0085	107.7 cm	
0090	87.1 cm	
0095	82.6 cm	
0100	74.9 cm	
0110	46.4 cm	
0120	7.6 cm	
0150	102.1 cm	
e h... 0155	101.1 cm	
0160	122.1 cm	
0165	132.6 cm	
0170	119.1 cm	
0180	139.5 cm	
0510	29.4 cm	
al 0515	41.2 cm	
0520	20.0 cm	
al 0530	22.8 cm	

Distribution Crotch 60% Front 40% back

Pelvis Template

Thigh girth 6 sizes differences compared to the waist.
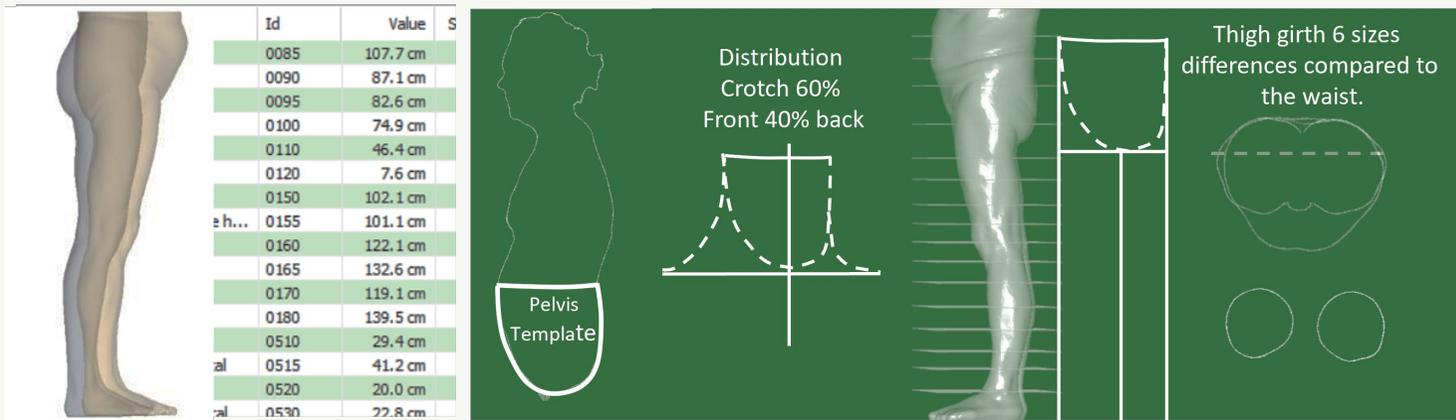
Fit Profile – CODE							
Contour	Form	H-Distribution	Posture additions	Angles	Size	Dart B	Pelvis shape
66	R2-0-00	3-2-4	P5 -B3- WP1	A4 -BB5 – S2	38	1	0

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Marlene (Designer, COZE) provided a tech pack. However, since COZE relies on third-party partners for production, it was decided to design the new shape/pants in Denmark and have the Turkish supplier manufacture the samples. One significant challenge encountered during this process was the difficulty in converting data between versions, as the supplier was several software updates behind the version used in Denmark.

The manufactured samples were successfully tested on two models sharing the shape code 66.

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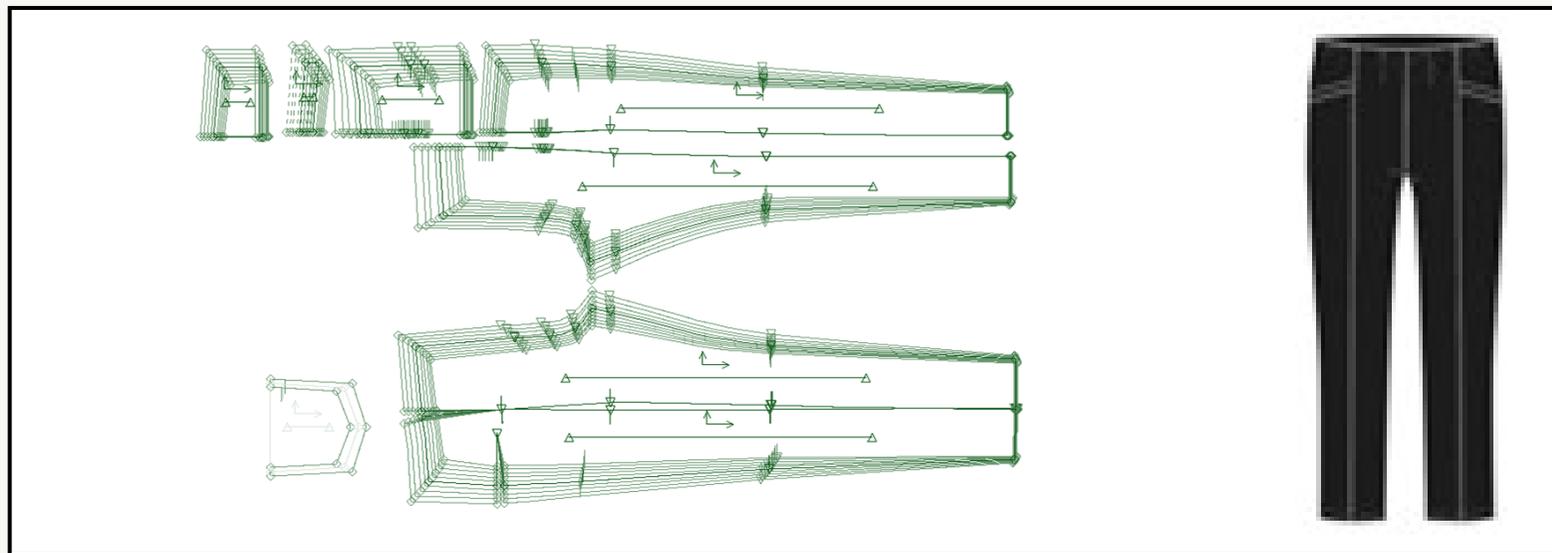
MARKET RESPONSE

The market has responded positively to the test style "ROUGE" — to such an extent that COZE has released additional color options and is now in the process of developing further design variants for this specific body shape. Further, the COZE case demonstrated that data-driven fit and sizing can serve as a positive differentiator in the market.
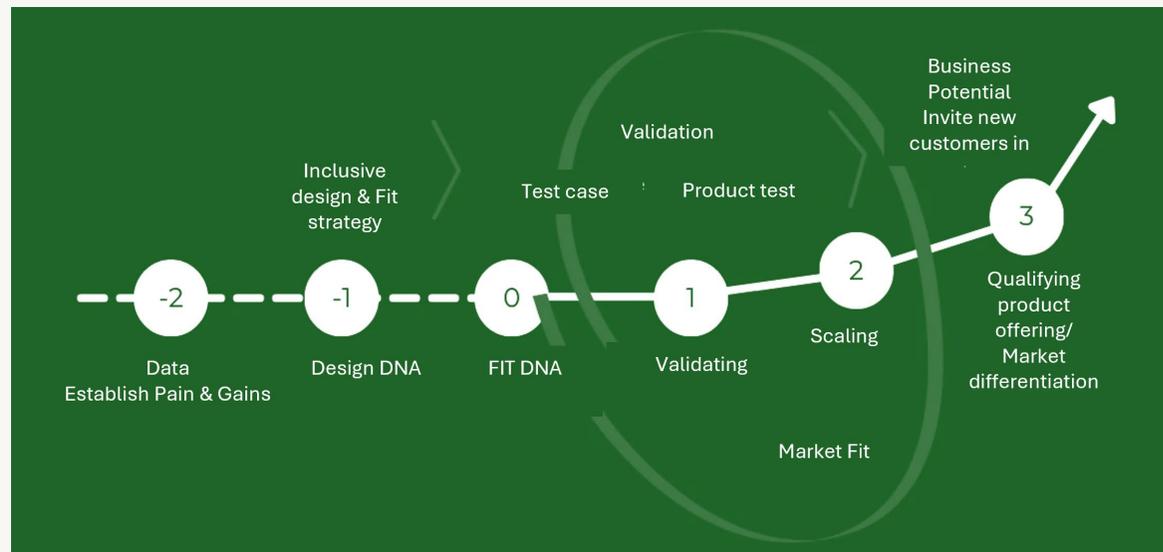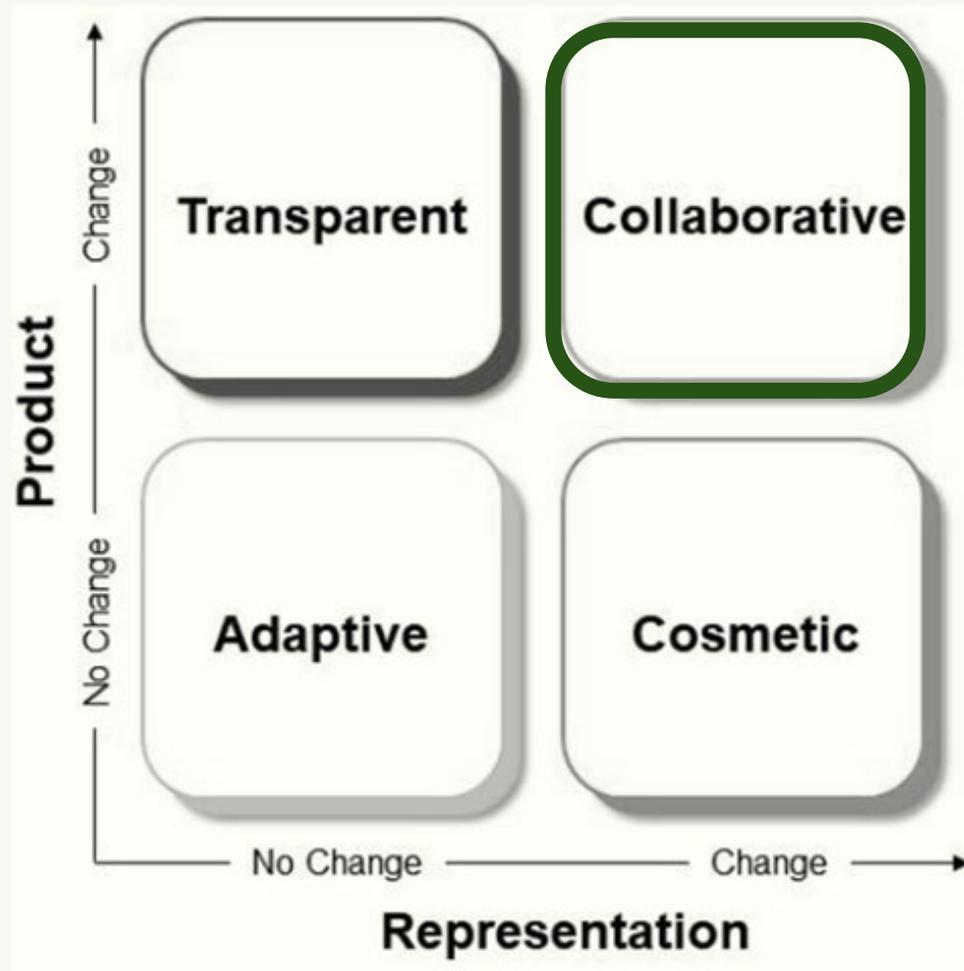
On-line CUSTOMER JOURNEY

TRANSPARANT CUSTOMIZATION

WEBSHOP LAURIE

1. It starts with the customer body type recognisition

- Body type description
- Body type description
- Body type description
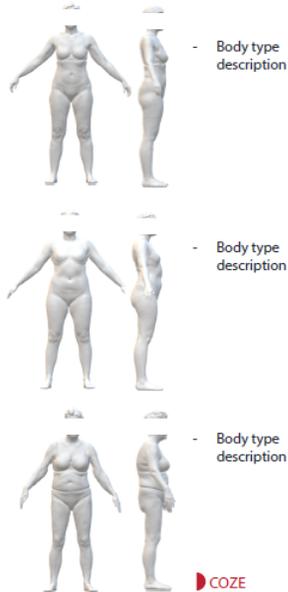
COZE

- The inclusive strategy for Coze decides which body types they will offer service to
- It can be either by body scanning and exact measures that comunicates identity of body type/size
- or by visual body type recognisition and a size chart to guide user into selecting size

2. Body type appear and size can be shown/selected

- CLICK for size guide
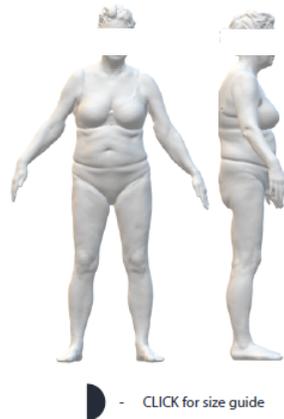
- Size will either be assesed from the body scan or if the identification is made visually then a detailed size guide on how to measure and select size will appear
- STYLE GUIDE service (added service)

3. A product category is chosen + a style

Piper

COZE
Rouge

Thea

Violet
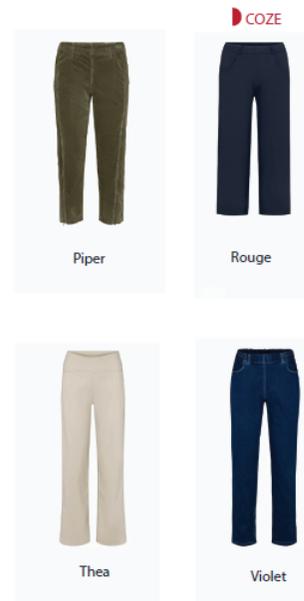
- According to the body type recognisition only a selection of styles that will fit your shape will be opened to shop from

4. A silhouette variation is chosen

Rouge slender crop

COZE
Rouge flared crop

Rouge slender long

Rouge flared long
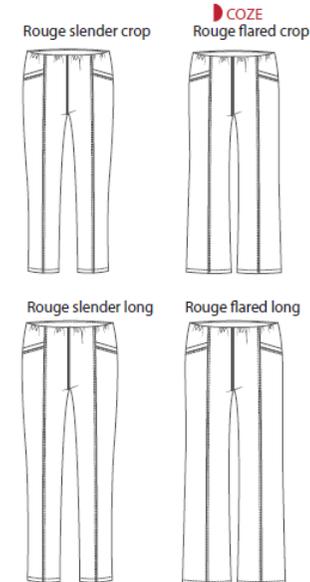
- Coze has some predefined silhouettes
- Coze has some predefined lengths

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TRANSPARANT CUSTOMIZATION

WEBSHOP LAURIE

5. A selection of front variations will be shown

6. A selection of back variations will be shown

RFC 1   RFC 2   RFC3 ◗ COZE

RSC 1   RSC 2   RSC3

RFC B1   RFC B2 ◗ COZE   RSC B1   RSC B2

17 cm slit   17 cm slit

RFL 1   RFL 2   RFL 3

RSL 1   RSL 2   RSL 3

RFL B1   RFL B2   RSL B1   RSL B2

17 cm slit   17 cm slit

- Coze has some predefined front variations

- Coze has some predefined back variations

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MASS-CUSTOMIZATION

WEBSHOP LAURIE

7. A selection of back pocket variations will be shown

BP 1

BP 2

BP 3 ▶ COZE

BP 4

BP 5

BP 6

BP 7

8. A selection of materials+colours will be shown

TWILL - 74% viscose eco-vero,
23% recycled polyester, 3% elestane

Dark olive

Winter blue

Charcoal

DENIM - 92% eco cotton,
6% elestane (T400), 2% elestane

Dark blue ▶ COZE

Washed blue

Black

For more details press fabric colour
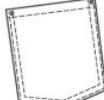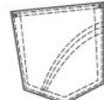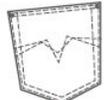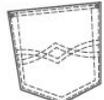
9. A selection of trim/stitch variations will be shown

TRIM - RIVETS + ZIPPER

Old brass ▶ COZE

Gun metal

Copper

TRIM - STITCHES

Tone in tone

Sand

Golden ▶ COZE

10. A final Design can be viewed and ordered

Rouge flared crop style Marianne

ADD TO CART

- The customized style will generate a visualisation of all the choices made before customer will accept the order

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7. Company Case; SELECTED

7. COMPANY CASE: SELECTED

The presentation of the company, SELECTED is structured around the research phases employed in their specific case – see research design, figure 26.

BACKGROUND, DIALOGUE MEETINGS & WORKSHOPS

The first phase of the research focused on gaining knowledge about SELECTED and understanding the company's structure and processes. Through online research, dialogues and workshops with the design team, the project/MCC team collected data to become acquainted with SELECTED. Through the workshops, the SELECTED team also gained an introduction to different perspectives related to mass customization and inclusive collection building.

ABOUT
SELECTED

Hej. We are SELECTED.
We make contemporary clothing for men and women. Since 1997, our design philosophy has been informed by the Nordic lifestyle of our homeland. A story of craftsmanship that celebrates the quality and simplicity of Scandinavian design with every garment. This makes our collections feel timeless with an underlying sense of modernity. Pieces that you can rely on season after season as you build a lasting wardrobe. A wardrobe that transitions seamlessly with you through everyday life and the most memorable moments. A wardrobe made for modern living.

FEMME

SELECTED FEMME offers contemporary womenswear rooted in Scandinavian simplicity. Our collections combine classic influences and high-fashion trends in signature designs of understated elegance. For everyday moments. For the special occasions. Pieces with longevity inspired by the essence of femininity. Stunning on their own and even better together. The kind of clothing we want to keep forever and wear on repeat.

Illustration 35: From SELECTED'S own website, March 2025. https://www.selected.com/da-dk/aboutuspage.html
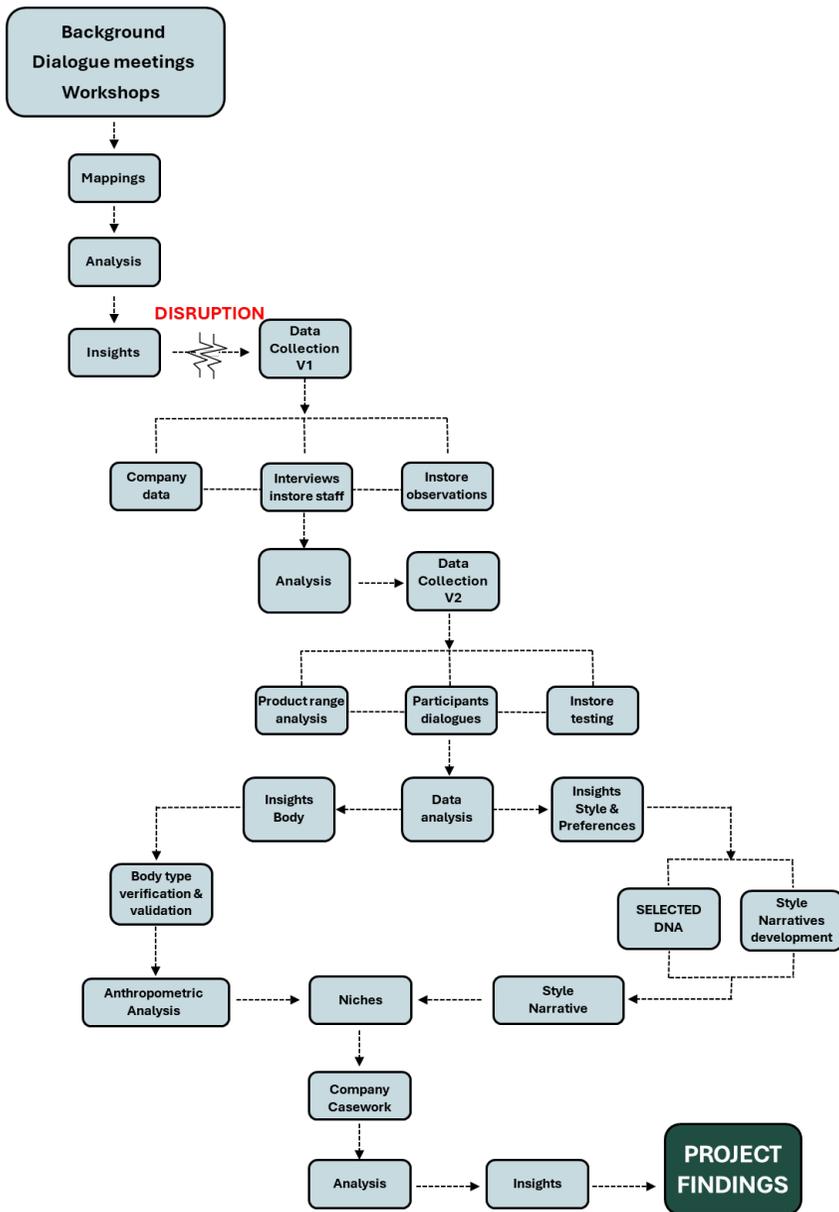
Figure 27: Research design, company case SELECTED, MCC Fashion 2024

7.1. MAPPING, ANALYSIS, INSIGHTS & DISRUPTION

The mapping and analysis of the collected data revealed that the company did not possess the ownership of the production facilities required to test the implementation of a full mass customization strategy resulting in a disruption of the approach to the following steps of the process.

7.2 DATACOLLECTION

Data collection included store observations and dialogue with staff SELECTEDs two flagship stores in respectively Aarhus and Herning constituting data collection V1 together with company dat. Data collection V2 consisted of product range analysis based on website information, instore testing of dresses and participants dialogues, again in the flagship stores in Aarhus and Herning. The research was conducted in the spring of 2024. Based on the collected datasets and analysis V1, the next steps of the research concentrated on dresses. The brand did not manage to locate models for body scanning within the timeframe of the project and consequently, the body type verification and validation together with the anthropometric data relied on previous research. The results were compiled in a mid-term report and presented to SELECTED. The mid-term report is presented on the following pages.

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Mass Customization for Circularity

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/ FEMME

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Observations & Findings
Spring 2024

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OBSERVATIONS & FINDINGS, MARCH 2024

Based on observations and dialogues with customers and staff, SELECTED flagship store,

Ryesgade, Århus

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01

OBSERVATIONS AARHUS, MARCH 2024

Uses fitting rooms , n= 171

92

01
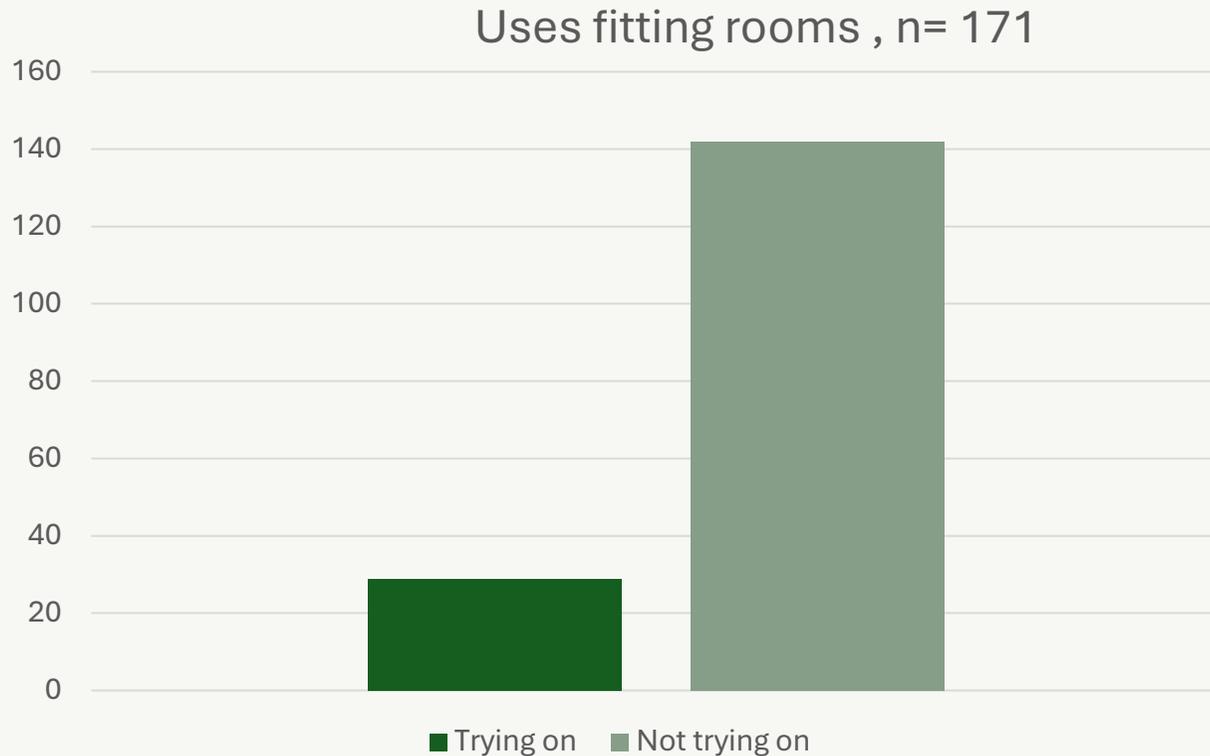
OBSERVATIONS AARHUS, MARCH 2024

COMMENTS.
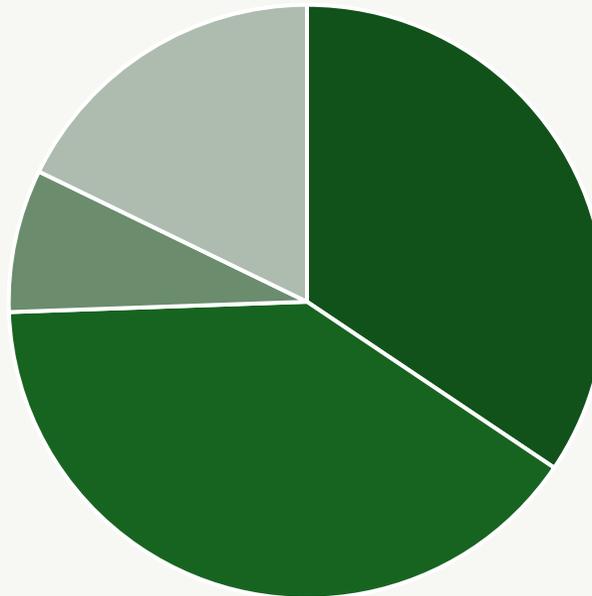
- Materials
- Size & Fit
- Price
- Quality, manufacturing

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01

OBSERVATIONS AARHUS, MARCH 2024

CHALLENGES REGARDING QUALITY & MANUFACTURING

- Customers notice it
- Customers particularly noticed the collars
- Same problem not observed in the men's department

SOLUTIONS & ACTIONS

- The production of blazers, dress trouser & suit has been transferred to the men's wear supplier, thus securing a more professional formal manufacturing standard

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01

OBSERVATIONS AARHUS, MARCH 2024

01
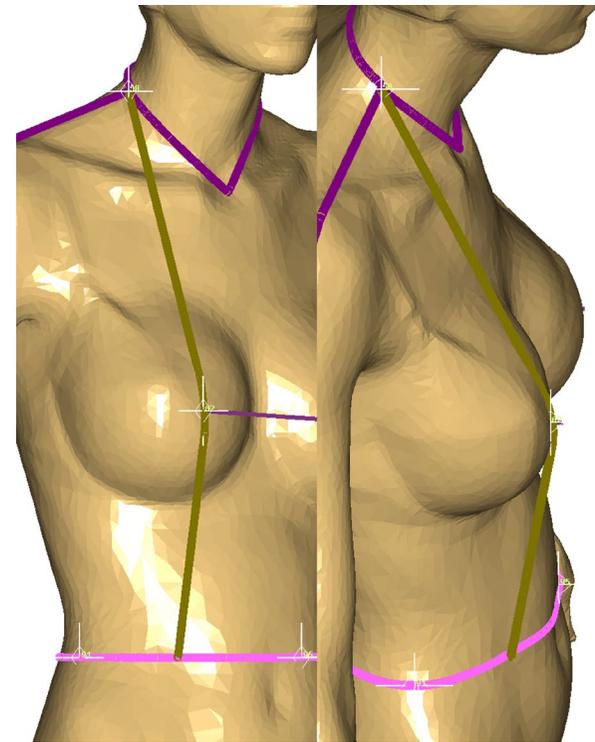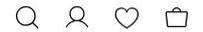
OBSERVATIONS AARHUS, MARCH 2024

"This rack of clothing received some criticism regarding materials, prints, and fit. None of these styles were purchased or tried on during the day of observation."

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01

OBSERVATIONS AARHUS, MARCH 2024

97

"Customers are unsure about sizes and therefore bring multiple sizes of the same product into the fitting room. This trend, known as 'bracketing', is also a widespread phenomenon in online shopping."

01

OBSERVATIONS AARHUS, MARCH 2024

"This set received the most positive comments, but at the time of observation, there was only a limited selection of sizes left. Those customers who could fit the remaining sizes purchased them after trying them on."

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01

OBSERVATIONS AARHUS, MARCH 2024

FIND YOUR FIT

SEARCHING FOR PERFECTLY FITTED JEANS?
DISCOVER WHAT FIT WORKS FOR YOU.

| SKINNY FIT | SLIM FIT | STRAIGHT FIT | WIDE FIT |
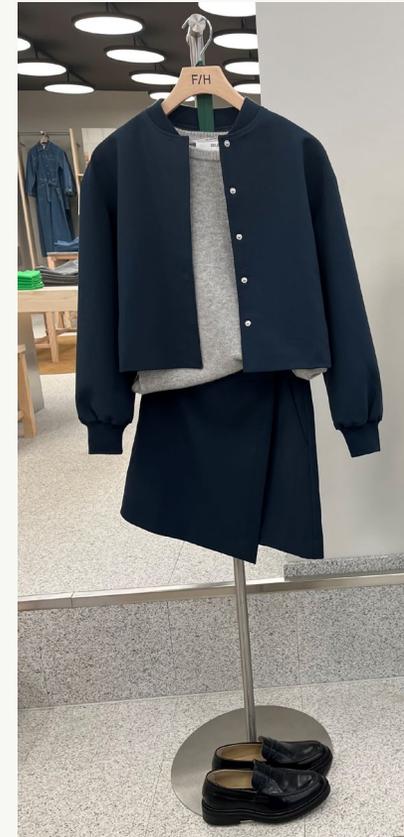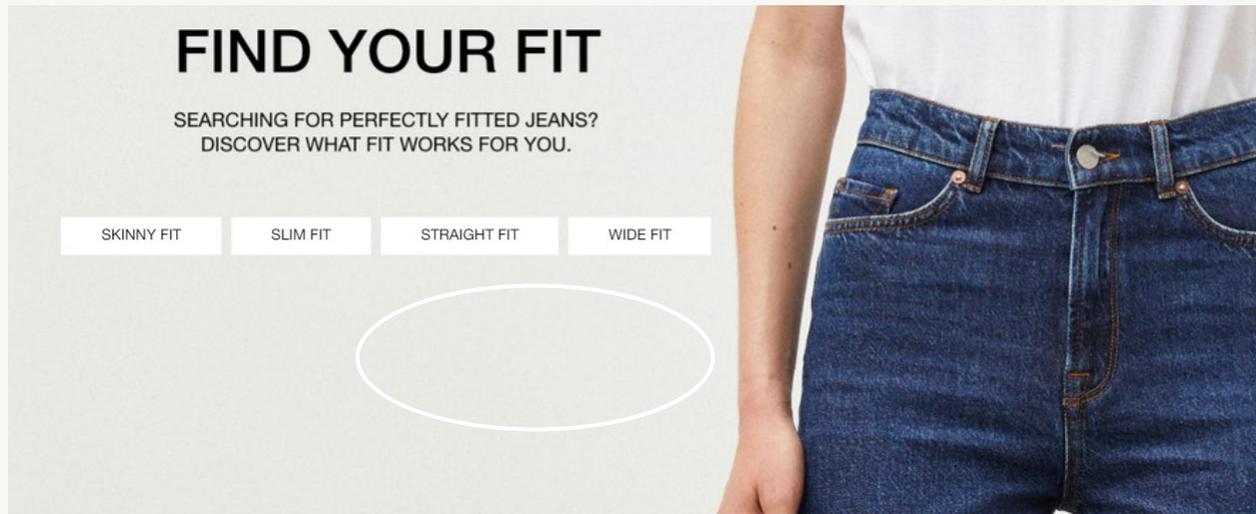
99

"Many customers didn't even want to try on the jeans, even though the salesperson tried hard to persuade them. When asked, they said they couldn't fit SELECTED's jeans, which they knew in advance, mainly because of the hip-to-waist ratio. Conversely, there were also two customers who bought a specific model that they knew would fit based on their experience."

"We have begun to focus on whether our pants have the measurements/fit that can accommodate more people/body types – our critical approach has been improved".
[Malene Schalck Rasmussen, Senior designer, SELECTED FEMME]

SELECTED / FEMME

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01

OBSERVATIONS AARHUS, MARCH 2024

100

Three customers tried this jumpsuit, but none of them bought it. All were asked why they didn't buy it.

"I just didn't think it fit well; it didn't really give me what I had imagined. I think it's the material I'm not so keen on."

"It's too short for me, which is a shame, I actually really liked it."

"I think it's a bit too expensive for the quality."

SELECTED
/ FEMME

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a transition towards circular economy

01

OBSERVATIONS AARHUS, MARCH 2024

Knitwear was the best-selling item of the day, but women with larger busts had challenges. There was a desire for an expanded size range.

"I am very happy with their knitwear; it is reasonably priced and is really good for everyday wear."

"Unfortunately, I can't even fit the largest size because it is far too short in the front. I would also have liked to see that there was not so much polyester and nylon in the product."

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01

OBSERVATIONS AARHUS, MARCH 2024

FOCUS DRESSES

Dresses proved to be a difficult category for several reasons. This was pointed out by both the staff and, not least, by the customers.

Product	Description	Material
Shirt dress with print	Black/white graphic print Length around knee	88% viscose 12 % PA
Dress, unicoloured	Black, big volume, long	80% viscose 20 % PA
Shirt dress, unicoloured	Sand colour, loose fit, ¾ sleeve length Length around knee	85% Lenzing Ecovero 15% nylon
Dress, print	Black with small flower pint Length around knee	55% Recycled polyester 45% Polyester
Dress, print	Black/white graphic print Length around knee	52% Recycled polyester 48% Polyester
Dress, unicoloured	Black, tight fit, long	68% Lenzing Ecovero 27% nylon 5% elastan
Dress, print	Black/white print, batwing sleeve, Length around knee	50% Lenzing Ecovero 50% viscose

01

OBSERVATIONS AARHUS, MARCH 2024

FINDINGS

- Several customers have challenges with tops (shirts, dresses, vests, blazers) due to lack of space for the bust. This creates balance problems.
- Both staff and customers expressed that dresses were often a difficult category, it is not only about fit, but also about style.
- The sleeves are often too narrow also in the forearm
- Trousers are challenged by hip width/waist width.
- Manufacturing is important.
- The dresses cover few shape variations
- Missing belt loops on the dresses, very similar expression.

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02

OBSERVATIONS & FINDINGS, HERNING APRIL 2024

Based on observations and **fittings** in the SELECTED store, Herning Centret, Herning

OBSERVATIONS MATRIX - FITTING

KATEGORI: KJOLE

Style

P.NR 100

SIZE: 42

SELECTED / FEMME

1. REAKTION	☺		☹ x		☺	KOMMENTAR: Den passer mig slet ikke, hverken i stil eller pasform

BALANCE:					RØRLIG VIDDE:					LÆNGDE:			
FOR	+		-	✓ x	BRYST BREDDE	+	-	✓ x	FULL	+	-	✓	
BAG	+		- x	✓	RYGBREDDE	+	- x	✓	TORSO	+	- x	✓	
ÆRME	+		- x	✓	TALJE	+	- x	✓	ARM	+	- x	✓	
					HOFTE	+	- x	✓	BRYSTP	+	-	✓ x	
					ÆRME	+	- x	✓	BEN	+	-	✓ x	
UDDYB	Den er for stram over hoften, derfor løftes nederdelen og ryglængden bliver for lang				UDDYB	Hofte og overvidde passer ikke sammen			UDDYB	Torso er ikke korrekt og ærmerne føler hun ikke der er flaterende			

SKULDER	+	-	✓ x	BRYST BREDDE	+	-	✓ x	RYG BREDDE	+	-	✓ x	NB	+	-	✓
												ND	+	- x	✓
UDDYB:				UDDYB:				UDDYB: Hun gav udtryk for at Halshullet for gerne måtte sænkes lidt, det handler dog om forkert balance, da halshullet bag ikke sidder korrekt.							

Look- Præferencer

MATERIALE	+	- x	✓	Det føles meget syntetisk
FARVE	+	- x	✓	Ikke lige min farve, føler mig som en lille pige
PRINT	+	-	✓	
LÆNGDE	+	-	✓ x	
SILHUETTE	+	- x	✓	Føler mig ikke tilpas, som en voksen i en lillepige kjole
DETALJER	+	- x	✓	Ærmelængden er ikke flaterende, overarmsvidden bag føles stram
FINISH	+	-	✓ x	
UDDYB	Den er for stram over hoften, derfor løftes nederdelen og ryglængden bliver derfor for lang			

"I don't really know what to say, it doesn't suit me at all, neither in style nor fit. I'm challenged by the material, it feels very synthetic, and is also a bit transparent."

"The sleeve length is flattering, but they hit at the back of the sleeve; I took it a size larger than I usually do." (Nanna, 29 years).


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SELECTED / FEMME

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03

FITTINGS OF SELECTED DRESSES, HERNING JUNE 2024

"I feel like an adult in a little girl's dress. For me, there's a mismatch in the proportions, I appear wide across the shoulders and the cut at the bust doesn't quite work."

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FITTINGS OF SELECTED DRESSES, HERNING JUNE 2024
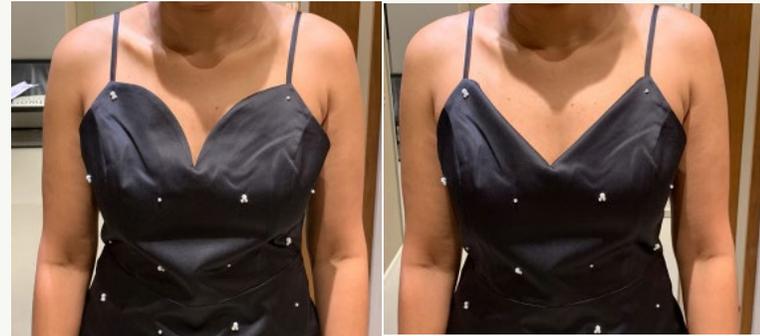
"I'm not quite sure what's happening above the bust; it feels like I have huge breasts. If I fold it down, I like it better. It's also a bit tight around the hip; can't you see that it doesn't sit well on the back? Otherwise, it might be fine."

SELECTED
/ FEMME

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DK design skolen kolding

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FITTINGS OF SELECTED DRESSES, HERNING JUNE 2024

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"I actually think it is nice, but unfortunately I don't like the material, it feels artificial. I easily appear very wide from behind; it could have a slightly smaller shoulder. I chose it in a size larger than my normal size."

SELECTED / FEMME

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03

FITTINGS OF SELECTED DRESSES, HERNING JUNE 2024

"The dresses are very similar in shape, and I end somewhere in between the sizes: If I take the dress a size larger, it fits better in the hips, but then it's too big in the sleeves."

SELECTED / FEMME

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"The material looks like a curtain. For me, the length is completely wrong, and I thought the ribbon on the back was very thick. It was not a dress I could find myself considering at all."

SELECTED
/ FEMME

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"It's super comfortable, but I really don't like the print and colour. It feels like sleepwear, and very adult."

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FITTINGS OF SELECTED DRESSES, HERNING JUNE 2024

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SELECTED
/ FEMME

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03

FITTINGS OF SELECTED DRESSES, HERNING JUNE 2024

SELECTED / FEMME

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circular economy

03

FITTINGS OF SELECTED DRESSES, HERNING JUNE 2024

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USER TESTS, AARHUS JUNE 2024

Fitting with dresses and interviews with 4 women, SELECTED flagship store, Ryesgade,

OBSERVATIONS MATRIX - FITTING

KATEGORI: KJOLE

Style nr: P.NR: BODYT:

SELECTED / FEMME

Participant	Age	Height	Size	Occupation
Ira	53	163	40 - 42 (L)	office work, accountant
Karen	63	165	40 - 42 (L) (size 42 upper parts)	office work, accountant
Tine	39	153,5	34 - 36 (XS-S) Trousers size 36-38	office work, researcher
Anne	38	169,5	38 – 40 (M) (prefer loose fitting clothes)	office work, researcher

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SELECTED / FEMME

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04

USER TESTS, AARHUS JUNE 2024

FINDINGS

"I really like this dress, it's beautiful and casual. But it doesn't suit me, it would suit a woman with a small bust better."

(Ira, 53 years old)

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USER TESTS, AARHUS JUNE 2024

FINDINGS

" It's not for me. It's for young girls. Both the pink color and the cut at the chest. It suits someone with smaller breasts better. I think it will look great on my 22-year-old daughter. There's something about the pattern and the color of the fabric that makes it a little 'girly'. I think it needs a petticoat. The fabric is very thin."

(Ira, 53 years old)

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04

USER TESTS, AARHUS JUNE 2024

FINDINGS

"Well, there are many who look quite good in such a short dress. But I don't feel comfortable in it. That's also because there's no stretch in it. So, if it were a little longer, I would like it. I do actually have a SELECTED dress that has sleeves like this, which go below the knee. I wore it all the time: At work and at home in the weekend."

(Anne, 38 years old)

From SELECTED website (left) , from user test (right)

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USER TESTS, AARHUS JUNE 2024

FINDINGS

"I think it's a bit short. It has a strange length on the leg. I wish it was longer. Personally, I think it's a bit like a cigarette tube. It sits loosely over the hips and doesn't follow me around when I move."

(Anne, 38 years old)

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From SELECTED website (left) , from user test (right)

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WORKSHOPS SELECTED

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SELECTED
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05

SELECTED SIZE GUIDE

Body measurements
Find the right size

FIND THE RIGHT SIZE

EUROPE	34/XS	36/S	38/M	40/L	42/XL	44/XXL
JEANS	25-26	26-27	28-29	29-30	30-31	32-33
Chest (cm)	82	86	90	95	100	105
Waist (cm)	64	68	72	77	82	87
Hip (cm)	91	95	99	104	109	114

CURVE

EUROPE		44	46	48	50	52
JEANS		44	46	48	50	52
Chest (cm)		105	110	115	120	125
Waist (cm)		90	95	95	105	110
Hip (cm)		114	119	119	129	134

SHOES

EUR	36	37	38	39	40	41
UK	3	4	5	6	7	8
USA	5	6	7	8	9	10

BODY HEIGHT	INSEAM
160 cm (Petite)	28"
165 cm	30"
170 cm	32"
175 cm	34"
180 cm	36"

Body measurements
Find the right size

CHEST
Measure around the fullest part of your chest and across your shoulder blades.

WAIST
Measure around your natural waist.

HIPS
Measure around the fullest part of your bottom. Approx. 20 cm below waist.

SIDE LENGTH
Measure from the hip to the ankle.

INSEAM
Measure from the inside leg at the crotch to your ankle.
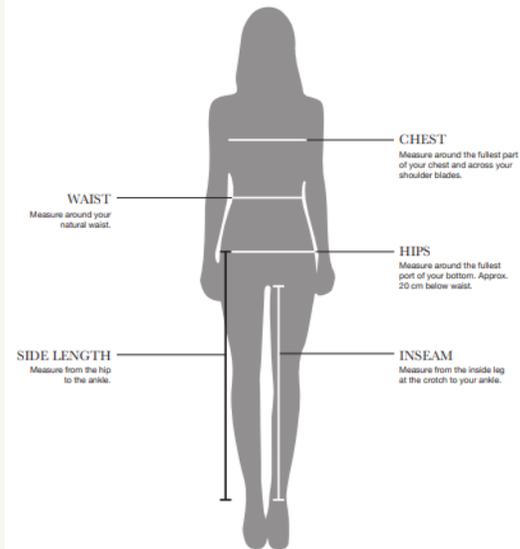
Responsibly Crafted

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SELECTED SIZE AND FIGURE TYPE

Body measurements
Find the right size

FIND THE RIGHT SIZE

EUROPE	34/XS	36/S	38/M	40/L	42/XL	44/XXL
JEANS	25-26	26-27	28-29	29-30	30-31	32-33
Chest (cm)	82	86	90	95	100	105
Waist (cm)	64	68	72	77	82	87
Hip (cm)	91	95	99	104	109	114

0.90 WHR	0.90 WHR	0.90 WHR	0.91 WHR	0.92 WHR	0.92 WHR
9 cm B-H	9 cm B-H	9 cm B-H	9 cm B-H	9 cm B-H	9 cm B-H
18 cm B-W	18 cm B-W	18 cm B-W	18 cm B-W	18 cm B-W	18 cm B-W

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Waist to hip ratio (W-H-R)
Waist to Bust ratio (W-B-R)

Bust circumference — W-B-R
Waist circumference
Hip circumference — W-H-R

Out of 24 body scans, 12 were marked green, 5 yellow and 8 pink.5 out of 12 (42%) of the green ones cannot be classified in SELECTED's sizes. None of the yellow ones can be classified.

HIPWIDTH & BUST

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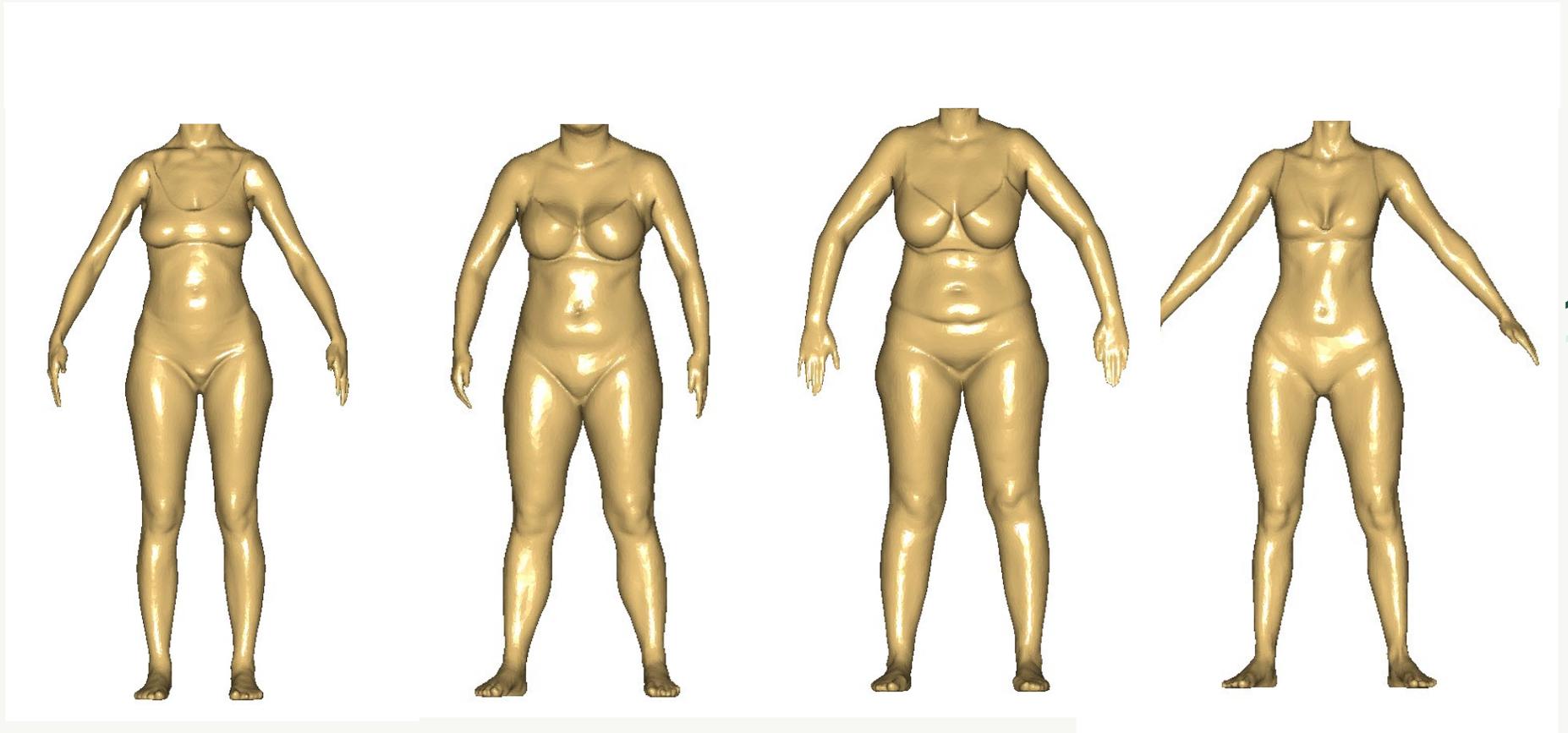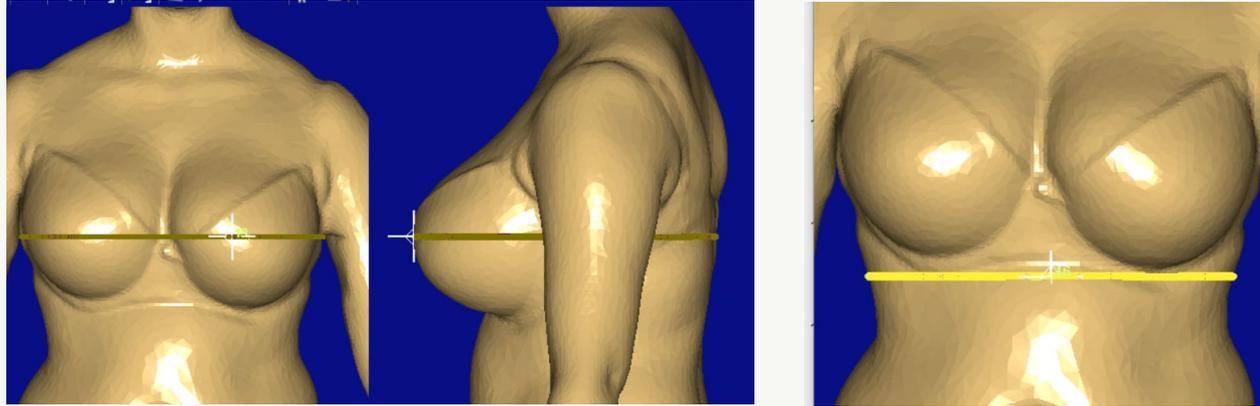
CUP SIZE: 78 UB – 103 BP= (103-79) = G
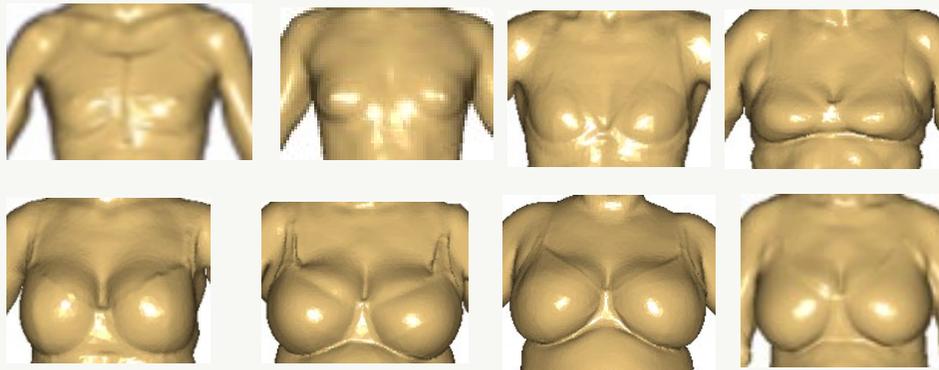
12 cm. = A-skål
14 cm. = B-skål
16 cm. = C-skål
18 cm. = D-skål
20 cm. = E-skål
22 cm. = F-skål
24 cm. = G-skål
26 cm. = H-skål
28 cm. = I -skål

SELECTED
/ FEMME

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STOMACH & UPPERARMS
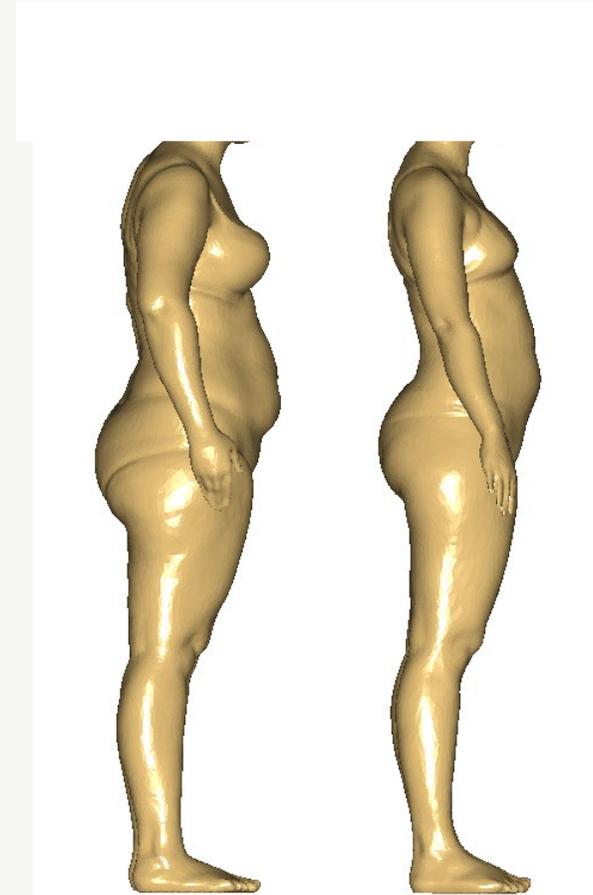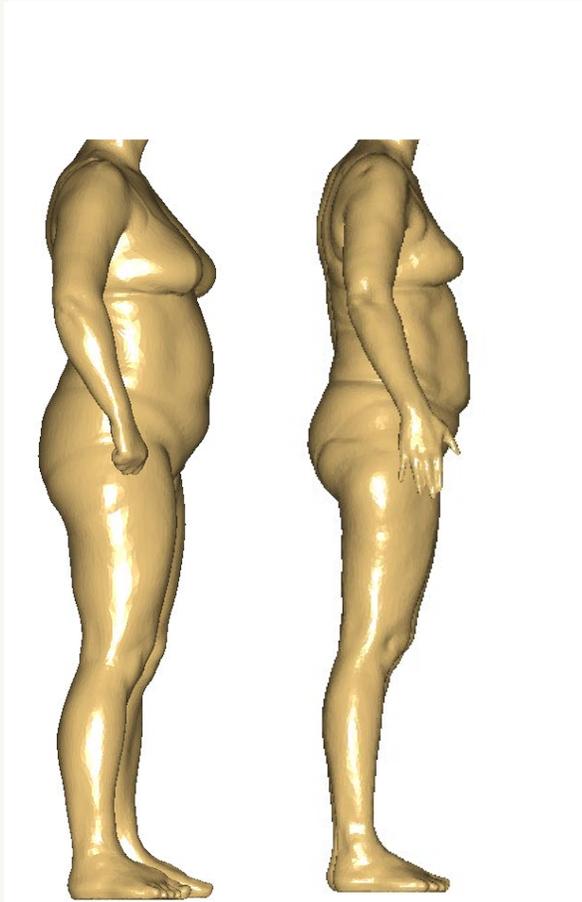
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OUTDATED PRINTS

The analysis of the first 50 dresses revealed a strong reliance on traditional Danish puffer dresses with floral prints that seem outdated and uninspired. This contradicts the brand's claim to offer modern and timeless pieces. SELECTED should consider reducing the proportion of such traditional puffer dresses with floral decorations. Instead, they should prioritize introducing more contemporary and minimalist print trends that better reflect the young, urban target segment.
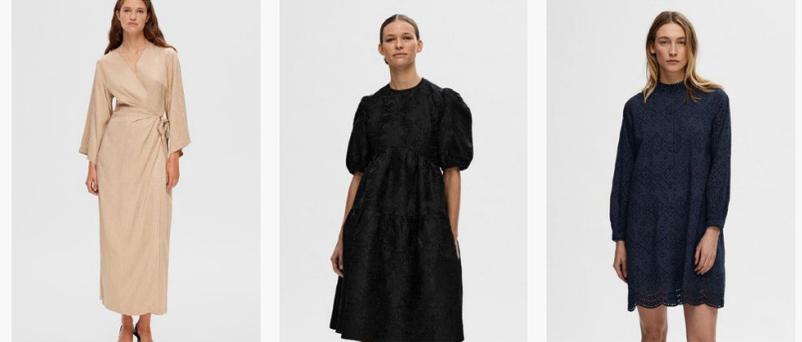
FITTING

Many of the dresses have oversized and "baggy" silhouettes, which can make the models appear older and less youthful, which is interesting. This does not fit well with the brand's supposed target audience of 25-35 year olds, who are likely seeking more flattering and age-specific styles.

LIMITED STYLE VARIETY

Limited style variety: Despite the large number of dresses, the analysis suggests that the brand primarily offers two main styles: basic dresses and party dresses. Basic dresses often come across as repetitive and uninspired, while party dresses can be overly elaborate and impractical for everyday wear.

Sortiment

AN OVERWHELMING RANGE

SELECTED currently has a whopping 491 dresses on its website. Such a huge selection can make it difficult for consumers to find the styles that truly match their personal preferences.

DESIGN ANALYSIS OF SELECTED

PHYSICAL CHARACTERISTICS:

FUNCTION:

SELECTED FEMME is a daughter brand of bestseller, which focuses on fashion and lifestyle products aimed at a female audience. The products are designed to cover women's daily clothing needs, including clothes, accessories and beauty products.

FORM:

The design of SELECTED femme is overall distinctively characterized by a minimalist and elegant style. The products often have simple, clean lines and shapes, which create a modern and refined expression. There is a clear focus on creating a harmonious and balanced look.

- The minimalist and elegant style can be perceived as somewhat one-sided. A little more variety in the design language could have given the collection a richer and more exciting expression.
- The products can seem simple and boring and perhaps lack the little extra that gives them a distinct character.
- Baggy and unflattering fits: Many of the dresses have oversized and baggy silhouettes that can make the models appear older and less youthful. This contradicts the brand's target audience of 25–35-year-olds who are likely looking for more flattering and age-appropriate styles.
- Limited style variety: Despite the large number of dresses, the analysis suggests that the brand primarily offers two main styles: basic dresses and party dresses. The basic dresses often appear repetitive and uninspired, while the party dresses can be overly elaborate and impractical for everyday wear.

MATERIALS:

The choice of materials ranges widely, but largely includes natural, quality materials such as cotton, wool, silk and linen.

Some more technical materials are also used, such as e.g. polyester and viscose, which contribute to the products being functional and durable. The surface treatment varies between glossy, matte and semi-gloss finishes.

COLOURS

The colour palette at SELECTED femme is predominantly characterized by muted, earthy shades such as beige, grey, brown and green. Certain stronger colors such as black, navy and bordeaux are also used, which create contrast and depth in the color scheme. In general, there is a harmonious and balanced use of colours, which contributes to the elegant and minimalist style.

- The color palette is a bit too limited and predictable. A few more surprising color combinations or bolder color choices could have given the collection a fresher look.
- Some products can seem a bit boring due to too many neutral, earthy colors.

DECORATION:

The decoration on SELECTED femme products is kept in a discreet and refined expression. There is used e.g. subtle fabric details, small metal appliqués or discreet logo prints, which add an exclusive touch to the products without dominating the overall expression..

PATTERN MAKING

The products from SELECTED femme are consistently characterized by a high quality in construction and production. Advanced sewing techniques are used, and transitions and joints are well finished. There is also the use of innovative production technologies, which contribute to making the products functional and durable.

- Some products may seem somewhat generic and could benefit from a more unique or distinctive design.

SELECTED / FEMME

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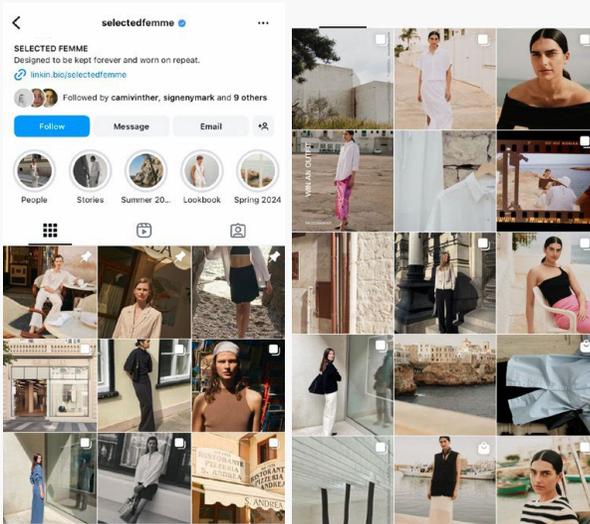
When you walk into a SELECTED store, you get a completely different impression than what they create on their social media. On social media, they have an aesthetic associated with the French Riviera – with images of tanned people, bright colors and a relaxed, luxurious atmosphere.

But in the stores, the reality is different. Here, you often encounter a more clinical and impersonal expression, with white walls, minimalist decor and an atmosphere that feels far cooler and more inaccessible than what you see online.

One possible explanation could be that they have found, from a marketing perspective, that the sunny, luxurious French Riviera aesthetic appeals more to customers on social media. Such idyllic and aspirational images can help create a strong visual impression and attract attention and engagement online.

This contrast between the practical, almost romanticized representation on social media and the actual in-store experience can be surprising and disappointing for customers. It leaves the impression that the company may not live up to the expectations they themselves create on platforms like Instagram and Facebook.

This discrepancy between online and offline can make customers question SELECTED's brand and identity. The company risks losing credibility if the experience in their physical stores does not match the image they promote digitally.

To avoid this contrast and ensure a more consistent customer experience across channels, SELECTED could profitably consider adapting their store concept so that it harmonizes more with the attractive, holiday-inspired style they successfully convey online.

Although SELECTED clearly wants to create a more exclusive and minimalist store aesthetic, this does not necessarily have to come at the expense of personality and authenticity.

A more personal and inviting store experience can certainly be combined with a clean and modern expression. For example, they could consider introducing warm natural materials, cozy lighting solutions and selected details that give more character and soul to the stores. In this way, SELECTED can achieve the desired "high-end" feel, without this leading to a complete exclusion of the personal and recognizable elements that characterize their digital branding.

Brand Examples

Massimo Dutto

Zara

The Row

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CASE: Shirt dresses and wrap-around dresses

Based on online analysis, it can be concluded that shirt and wrap-around dresses make up a good part of the SELECTED dress range. Based on fittings and style observations, it can be concluded that there are few style niches and few variants within these two categories. We have had two designers* give a suggestion on how greater variation within three renamed style niches can contribute to greater variation in both silhouettes, details and expressions.

CASE: MODULAR STRUCTURE

Shirt dresses and wrap-around dresses

S E L E C T E D

F E M M E / H O M M E

SHIRTDRESS / WRAP AROUND / SUIT DRESS

REGULERBART

MODULOPBYGGET

*Ada og Anne-Kathrine, design interns

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Quiet Luxury

TO ACHIEVE THIS AESTHETIC, YOU DON'T NEED TO SHOP THE LATEST TRENDS OR BUY AN ENTIRELY NEW WARDROBE EVERY SEASON; RATHER, YOU CAN SLOWLY BUILD YOUR CLOSET UP WITH PIECES THAT WILL LAST. QUIET LUXURY ISN'T ABOUT LABELS OR FLASHY PIECES, IT'S ALL ABOUT SHOPPING FOR HIGH-QUALITY, TIMELESS PIECES. FILL YOUR CLOSET WITH BASICS THAT YOU ABSOLUTELY LOVE AND CAN WEAR ON REPEAT. STICK TO A COLOR PALETTE THAT ALLOWS YOU TO MIX AND MATCH ALL OF YOUR ITEMS.

Silhuettes

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Collars

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Sleeves
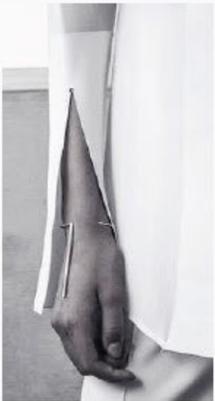
Cuffs

Modern Monochrome

THE MODERN MONOCHROME AESTHETIC FOCUSES ON CLEAN, MINIMALIST DESIGNS IN NEUTRAL, MUTED COLOR PALETTES LIKE BLACK, WHITE, BEIGE, AND GRAY. THE COLLECTION INCLUDES STREAMLINED SILHOUETTES AND QUALITY FABRICS, RATHER THAN BOLD PRINTS OR EMBELLISH-MENTS. THE STYLES RANGE FROM CASUAL EVERYDAY WEAR TO MORE FORMAL, POLISHED LOOKS. OVERALL, THE MODERN MON-OCHROME AESTHETIC OFFERS A REFINED, MINIMALIST TAKE ON CONTEMPORARY FASHION, APPEALING TO THOSE WHO PRE-FER A VERSATILE WARDROBE IN A NEUTRAL COLOR SCHEME.
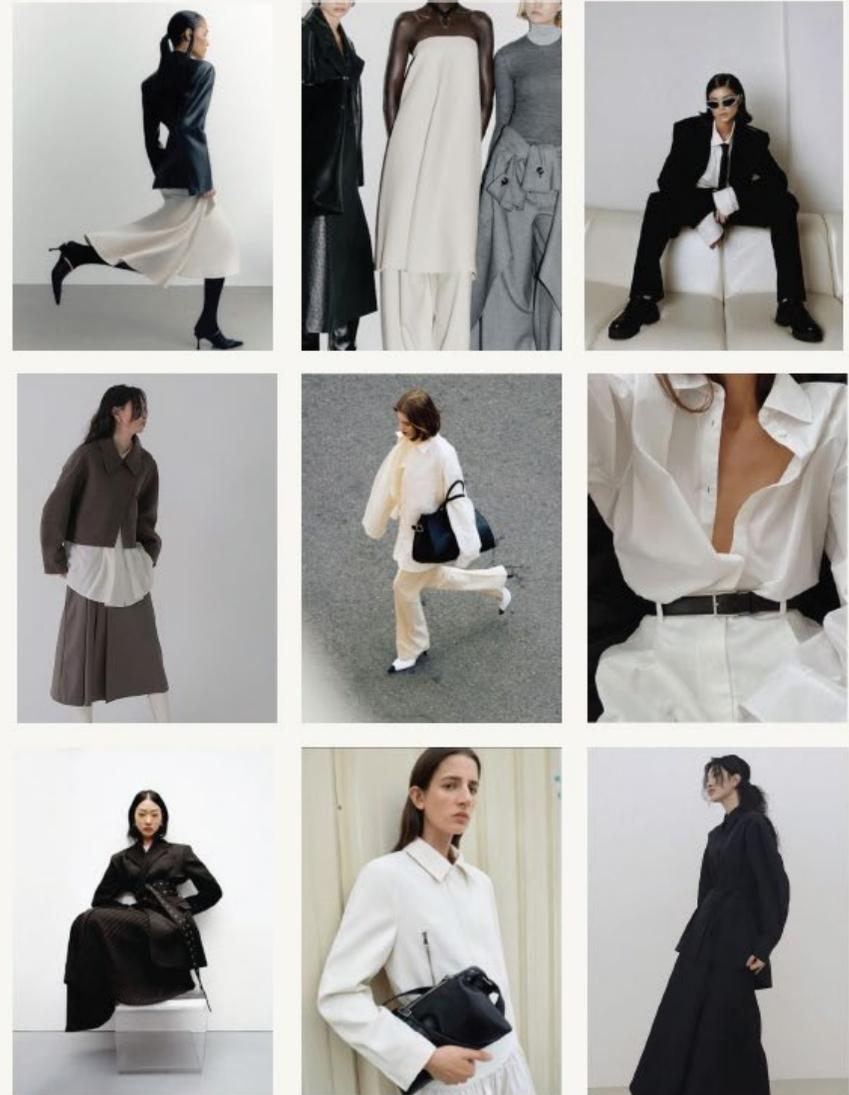
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Silhuettes

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Collars

Sleeves
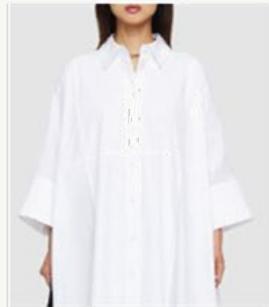
Cuffs

Core

THE CONCEPT OF A CORE WARDROBE OFFERS A
PRACTICAL AND STYLISH APPROACH TO DRESSING.
BY SELECTING TIMELESS PIECES THAT COORDINATE
WITHIN A COHESIVE COLOR PALETTE, YOU CAN CREATE A
RANGE OF OUTFITS THAT REFLECT YOUR PERSONAL STYLE
WHILE REDUCING THE STRESS AND WASTE ASSOCIAT-
ED WITH EXCESSIVE CONSUMPTION. IT IS A FOUNDATION
UPON WHICH YOU CAN BUILD YOUR UNIQUE FASHION
EXPRESSION, EMBRACING THE ART OF MIXING AND MATCH-
ING TO CREATE ENDLESS POSSIBILITIES FROM A THOUGHT-
FULLY CURATED COLLECTION OF ESSENTIAL GARMENTS.
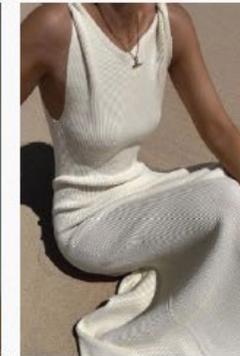
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Silhuettes

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kolding
DK:

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Akademi

trace
a transition towards
circular economy

Sleeves

Collars

Adjustable

Adjustable

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design skolen kolding DK:

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trace
a transition towards
circular economy

Cutlines

Cutlines

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design skolen kolding DK

Det Kongelige Akademi

trace
a transition towards
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Details

SELECTED
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design skolen kolding DK:

Det Kongelige Akademi

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circular economy

Details

VIA University College

design skolen kolding DK:

Det Kongelige Akademi

trace
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Shoulders

Plackets

Pockets

VIA University College

DK

Det Kongelige Akademi

trace
a transition towards
circular economy

SELECTED Inclusive MODULAR range plan

*Bodytype x= moderate hourglass (match 37%)
*Bodytype BX = bottom hourglass (match 18,4%)
*Bodytype x w/bust =

PRODUCT CATEGORY & STYLE NICHE	SILHOUETTE	SLEEVE COLLAR/NECK	Bodytype x / Bodytype BX / Bodytype x w/bust	Bodytype x	Bodytype BX	Bodytype x w/bust	STYLES	TOTAL
Shirt Dress "QUITE LUXURY"	X hourglass	X+1+5 X+3+2 X+7+4		●●●	●●●	●●	3 x 2	
	H straight	H+1+5 H+3+2 H+7+4		●●●	●●●	●●	3 x 4	
	O volume	O+1+5 O+3+2	●●				2	8 (6)
Shirt Dress "MODERN MONOCHROME"	HH oversized	HH+3+7 HH+3+1	●●				2	
	A a-line	A+3+7 A+3+1	●	●	●	●	2 x 1	
	S soft shoulder	S+3+7		●	●	●	1 x 1	5 (2)
Shirt Dress "CORE"	A a-line	A+3+7 A+3+1	●	●	●	●	2 x 1	
	H straight	H+3+7 H+3+1	●	●	●	●	2 x 1	4 (2)
Wrap Dress "QUITE LUXURY"	X hourglass	X+1+5 X+3+2 X+7+4	●	●●	●●	●●	3 x 2	
	A a-line	A+3+7 A+3+1	●	●	●	●	2 x 1	5 (4)
Wrap Dress "MODERN MONOCHROME"	A a-line	A+3+7 A+3+1	●	●	●	●	2 x 1	
	X hourglass	X+1+5 X+3+2		●●	●●	●●	2 x 2	4 (3)
Wrap Dress "CORE"	H straight	H+1+5 H+3+2		●●	●●	●●	2 x 3	
	A a-line	A+3+7	●				1	3 (3)
							Shirt dress	17 (10)
							Wrap dress	12 (10)

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*Terkildsen, M.N. 2024 "To Fit in Danish Fashion" Ph.D. Dissertation

8. Reflections & Recommendations

8. REFLECTIONS & RECOMMENDATIONS

Feedback from the business partners clearly indicates that the project has led to meaningful discussions and changes—both at a tangible, practical level and at a more intangible, conceptual level for both companies. On the tangible side, this is evident in the companies' initiatives to develop new fits and design elements, laying the groundwork for the real-world implementation of mass customization. On the intangible level, there has been a noticeable shift in mindset: participants have become more attuned to user needs and have initiated discussions around the relevance and purpose of their assortment strategies.

The importance of collecting user data—particularly through observational methods—has been highlighted repeatedly throughout the project. Both participating companies have embraced data-driven product design as an element to inform design processes

8.1 DESIRABILITY, VIABILITY & FEASIBILITY

In both company cases, the data collection identified areas of desirability among the companies' user groups.

Customer Product Perspective

From the users' standpoint, desirability refers to how well the product resonates with their preferences, needs, and values. The data collection revealed specific areas that users find appealing— such as fit, style, comfort, or inclusivity. These insights highlight what customers actually want, thereby providing direction for product development that is user-centered.

Business / Manufacturer Perspective

From the company or manufacturing side, the concept of viability and feasibility comes into play.

- Viability relates to the business potential of these desirable product features—can the company generate profit by meeting user needs? The data gives evidence that fulfilling specific user desires could open up new market segments or increase customer loyalty.

- Feasibility refers to whether the company has the capacity—technically, logistically, and structurally—to produce these desirable features. It assesses whether existing production systems, supply chains, and resources can accommodate the product or strategy in question.

8.1.1 COZE

In the COZE case, the data indicated a desire for a different fit that addressed a body type that is currently not catered to. At the same time, customer feedback also indicated a desire for more expressive and eloquent design elements and details. COZE and MCC worked together to meet the user's desire for an alternative fit by developing a new variation of trousers. Despite the challenges in developing the new basic pattern and transferring these to the system the supplier employed, they managed through teamwork to demonstrate the feasibility of including two different fit variations and thus cater for two diverse body types. The new trousers was subsequently introduced on Copenhagen Fashion Fair in January 2025 and customer (here the retailers) reactions, feedback, and demands indicates that the new model also is viable.

Accommodating customers' desire for more design variations (details and elements) at first glance seems less complicated than introducing new base forms and fits to include more body types. However, within the context of the project, COZE has only taken the first step towards offering more design variations by developing a prototype for a landing platform as demonstrated in the customer journey (see pages xx-yy). This means that the feasibility and viability have not yet been implemented, tested or demonstrated.

8.1.2 SELECTED FEMME

Similar to the COZE case, the datasets in the SELECTED FEMME case also revealed a clear user need for fit variations. However, as SELECTED is a significantly larger company than COZE, structural differences posed greater challenges. These complexities made it more difficult for the SELECTED team to exemplify new initiatives and, in turn, to demonstrate the full extent of the viability and feasibility of their proposed actions.

Nevertheless, SELECTED FEMME recognized the potential for enhanced fit diversity and began exploring opportunities internally. In response, the design team adopted a customer-centric approach and initiated a modular design development process—marking an important first step toward integrating fit variation into the overall product strategy.

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8.2 REFLECTIONS

The project has demonstrated the potential of data-informed product development while also raising awareness of the feasibility and viability of targeting niche audiences.

COZE successfully implemented a new body type based on anthropometric data provided by the MCC team. As a result, a graded base pattern was developed to accommodate the identified body shape. Additionally, a specific style was designed as a case study. A complete tech pack—including data conversion instructions—was sent to the manufacturing facility, a European supplier, and the resulting prototype was returned to COZE's facilities in Aarhus for fit testing. Furthermore, COZE conducted virtual fit testing in CLO using a body-scanned avatar, thereby making effective use of digital technology to support data-driven product development.

The project has developed a user centric model that together with the developed data flow model highlight the importance of working with extensive amounts of data to understand real people and their preferences and needs.

The observation sessions in the different stores were crucial in the understanding of customer preferences and needs. Both companies articulate that working with users in this way has been an eyeopener, and an approach they intend to pursue.

8.3 NICHES

The project has identified niches of users that do not experience that their specific needs and preferences were catered to. In the COZE case the new identified body type was a significant element in implementing a new body standard and thus a new niche. Furthermore, the research pointed at preferences for more specific design details among the COZE customers.

Together these elements paved the way for the implementation of mass customization as COZE can create a customer journey where two different body standards can choose between different design variations. One of the challenges in offering mass customization is the delivery time, which depends on the level and complexity of customization.

8.4 INTERFACES

The project has worked with existing as well as developed new interfaces.
The User Centric Model developed within the project framework fulfills the intention. However, the model needs further elaboration of methods and tools for collecting the datasets, which are the entire basis of the model. The related data flow model contributes to create attention to the communication flow to the customers, which is an essential element in ensuring the successful implementation of mass customization

8.5 REFELCTIONS ON THE DELIVERABLES

Four deliverables constituted the objectives of the project, they have been addressed through out the report but are summarized below.

1) *A holistic analysis of users' preferences within fit, sizing and style*

The project has collected individually company-related datasets for each of the two partner companies and analyzed these focusing on user preferences within fit, sizing, and style. The data collection has been executed by the MCC team and predominantly consisted of store observations, retrospective dialogues with customers, interviews and dialogues with shop staff. Focus groups have participated in trying existing product offerings and provided feedback on these.

2) *Two exemplary niches that can inform technological systems*

The partner companies aim at quite different target groups both relating to age and style. Consequently, the exemplary niches relate specifically to each of the companies individually. However, the niches possess relevance for companies beyond the partners.

Regarding body types, the analysis has identified an additional niche related to COZE. It has been implemented in COZE's system and product portfolio. In relation to style, the analysis has identified user preferences for more design details, which opens up COZE's possibilities to offer design variants in a mass customization system. COZE has taken the first steps in this direction.

In the SELECTED case, two additional body-types were identified as potentials for establishing exemplary niches. One with more bust width and one with more hip width.
During the process, the partners decided in collaboration to focus on the body type with more bust width. This body-type thus established a new niche to be included in the SELECTED collection.

SELECTED addressed the new niche from a design perspective and has begun to develop a modular system of design details that included the body type with the bigger bust width. The pattern making part of the development has not been executed within the time frame of the project, it is however planned to be put to action after the finalizing of this project.

3) Development of new datasets based on feedback from user groups. Mapping of the companies' ability to adopt and implement a holistically oriented and highly complex interface
The business setup of both companies and their dependence on third-party suppliers has significantly disrupted the project timeline. The project has managed to get feedback from users on the existing product range, but getting user feedback on the new initiatives has not been an option.

However, COZE managed to present their new trouser model at COPENHAGEN Fashion Week in January 2025 and received very positive feedback from buyers, as the new model ended up being their second best-selling product.
Both companies are challenged in their ability to adopt and implement a holistically oriented and very complex interface, as they do not control their supply chain and do not own their basic patterns. This is not a unique situation in the Danish fashion area, but it represents a significant obstacle to implementing new systems.

4) Plan for scalability identifying further research and development activities based on the model for mass customization.
The project has demonstrated that it is possible for companies to incorporate multiple niches—such as diverse body types and style variations—into their product portfolios. However, this integration is complex, largely due to existing organizational structures and limited access to modifying core systems.
The scalability of these findings is highly dependent on close collaboration with stakeholders at the production level. In a Danish context, where production is typically outsourced, the successful implementation of mass customization is more likely to be achievable through partnerships with international manufacturing partners. This highlights a strong potential for European collaboration, as many EU countries still host active production facilities. Additionally, the principle of subsidiarity supports tighter integration of logistics and timelines within a regional European framework.

ACKNOWLEDGEMENTS

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