ABSTRACT

In this PhD thesis, titled *'To Fit in Danish Fashion'*, I research the implications of current fit and sizing systems and elucidate what is needed to embrace fit and size inclusivity. Grounded in the profession of pattern engineering and placed within a Danish context, the main contributions of my research relate to body-form classification systems, which I have divided into three main categories: sizing systems, body-form systems and alteration systems. Body form variation is generally not addressed within mass production as this often requires amendments to production practices; however, the study shows that even people within a population who share similar size and measurements may vary in form, posture and proportion and that by not counter this variation a significant amount of people will experience reduced satisfaction with the fit and sizing of clothes.

The thesis takes a pragmatic approach in accordance with the author's practice experience and professional background, and it uses a mixed methods approach with both quantitative and qualitative analyses. The empirical material comprises in-store observations, interviews, questionnaire surveys, body scanning and measuring of Danish women aged 18-77, and practice-based pattern engineering experiments. This means that in addition to providing primary anthropometric data, the study places significant emphasis on hearing women's own voices and capturing their personal statements and experiences. This approach ensures that the research is enriched with first-hand insights and perspectives from women themselves, providing a deeper understanding of their individual experiences and how they interact with and are affected by the existing fit and sizing standards used in fashion and clothing.

The empirical material bears witness to a tendency in apparel retail and industry to make social judgments based on a person's body form and size. The research shows that the lack of flattering fit and design for women in all shapes and sizes presents a significant challenge for both women and the fashion industry. Observing women shopping for clothing reveal a sense of stigma experienced by those who find the available product range to be designed for a customer base with a specific body shape that they don't possess. Although the body scanning data indicates that, in reality, very few bodies conform to these standards, many believe they are the exception rather than the norm and see themselves as a rare misfit. From a lean production perspective, simplifying processes and product offerings may seem enticing, but from the customer's standpoint, it was perceived as limiting and exclusionary. Furthermore, in-store observations reveal that product design and availability change with size codes, as the designs presented in the size range 34-42 proved different from those in sizes 44 and above. This was found problematic by women in the upper-size segments, as they felt constrained in expressing their personal style. The study also revealed that while customers often find it challenging to locate their appropriate size within a numerical sizing system, they are more successful in identifying their correct shape category when shown body scanning images, which indicates the usefulness of introducing body form and visual cues to assist people in finding suitable products.

Technically, the current theory and practice in apparel engineering often neglect body form variation, as accommodating these differences might necessitate systemic changes. 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

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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% (8.8-12.8 %) of the body-scanned women complied with the body shape and measurements included in the standards used in the Danish industry. Furthermore, 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.

In order to address body form variations and make the information operational for use in product development, each participant's body form was coded into a profile/ classification system based on an in-depth analysis of the morphological diversity that exists among female body forms and sizes. The system works by a systematic evaluation and index coding of contour, posture, proportions, form and body components. Consequently, it generates a personalised fit profile code containing personal customer data, which can be used to inform fit and size solutions, match people with existing products, or even recommend a similar body shape avatar for fit testing. In addition, I have tested the relevance of current sizing standards by testing linear measurements from the standards against the measurements from a body-scanned population. The comparative survey results enabled me to establish significant statistical differences and provided me with the actual hit rate.

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 my 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.

In conclusion, my research suggests that in addressing inclusion, we must accept diversity, variability, and complexity. Combining this insight with technological advancement and the rise of Industry 5.0, that suggest an increased focus on mass customisation and personalisation, I suggest that a more fundamental change is needed. The findings in my doctoral work suggest that we move away from viewing fit in apparel as a system of average and instead look for ways of embracing the science of individuals if we are to become inclusive. A central assumption is that we must address the female body as a complex adaptive system within which body form, shape and size represent several closely linked subcategories or deviations. For these systems to be impactful, the systems need to connect and interact directly with product development and be operational across disciplines. It is not a one-size-fits-all solution; each brand must customise solutions according to the target audience, market position and production setup. Ultimately, it is not about designing more products for a few customers within the same standards as it creates overproduction, but instead about creating business by inviting new customers in. The latter is an essential aspect because although my research establishes several fit/shape profiles, it is not the intention that the same style is produced in multiple body shape variants; on the contrary, the general idea is that a brand's product portfolio is curated to contain shape variation without extending the collection. Thus, the dissertation's contribution is an empirically based argument for using detailed body shape information when making systems to be used across professions, as this will enable informed decisions on a more inclusive product assortment based on inclusive fit and sizing strategies.