Chapter 1

General introduction
Designers and design thinkers have long been concerned with the environmental and social implications of the field. Victor Papanek’s criticism of the design profession as “one of the most harmful professions” for creating products wasteful of environmental resources in the 1970s is at the start of most historical accounts of sustainable design (Madge, 1993, 1997; Knight, 2009; Keitsch, 2012; Ceschin and Gaziulusoy, 2016). However, it was not until the 1980s that environmental concerns in design reached mainstream practice. The following two decades saw increasing application of “green” and “eco-design” principles aimed at designing less environmentally impactful products by focusing either at the production phase or by designing the whole product lifecycle. Yet another significant environmentally-driven stream of design emerged at the turn of the 21st century. A focus by the sector on the concept of “sustainability” led thinkers in the field to criticize previous eco-efficiency approaches. Despite efforts to minimize the environmental impact of products, market-driven design practice promoted consumerism and therefore growing material production and human frustration. From this perspective, developing low-impact products was not enough. More meaningful interactions between people and things had to be facilitated in order to enable a flourishing and consumption-lighter society (Ehrenfeld, 2008). Since then, much of sustainable design research and practice has focused on influencing human behaviour and facilitating social change (Chapman, 2005; Fuad-Luke, 2009; e.g. Thorpe, 2012; Manzini, 2015). In that way, the design community – a community traditionally committed to increasing people’s quality of life by constantly developing better products and therefore to growing material depletion - has been at the same time engaged in discouraging consumerism and in reducing environmental impacts.

Consumerism and growing production quantities or volumes have been particularly alarming in the clothing sector during the last few decades. As a result, garments have received increasing attention in sustainable design, and environmental and social issues have taken over the fashion agenda at all levels, including academia, businesses and public policy across the Netherlands and Northwest Europe. Environmental concerns have arrived later in fashion compared with other design sub-disciplines (Thomas, 2008, p. 526), but they have spread out rapidly. The different approaches to sustainable design described above have influenced those of sustainable fashion significantly. For example, fashion activism has promoted more meaningful interaction between people and garments in order to discourage usage of clothing as if it were disposable (see e.g. Busch, 2008; Cao et al., 2014; Hirscher, Niinimäki and Armstrong, 2018). However, the environmental effects of these efforts are largely unknown, and this knowledge gap is preventing the field from making significant impact.

Given the context above, the goal of this thesis is to advance knowledge on design for lower clothing volumes and to explore the role of academic research in contributing to finding effective paths. Although for the main inquiry of this thesis I have chosen the provocative question “can design
confront consumerism?”, the studies that are compiled here actually explore the (more concrete) possibility of reducing clothing production volumes by design. This possibility is explored critically and from a variety of perspectives; using research approaches stemming from the humanities, the exact sciences, and research through design. This research journey led me to other issues that, next to clothing volumes, are central for this thesis, namely, product personalisation and the wardrobe.

Product personalisation is a main approach to reduce production volumes in the field. By involving users in the design and manufacture of their clothes, designers intend to better connect the wishes and bodies of the wearer with the materials and processes of their garments and reduce new product demand. Moreover, emerging manufacturing models for product personalisation are promoted as enablers of a more environmentally-friendly apparel sector. Therefore, personalisation was - together with clothing volumes- a second starting point for this thesis. The significance of the wardrobe emerged along the way. The term wardrobe here refers to the complete collection of garments owned by a person, regardless of the place where they are stored, and their usage. While analysing people’s clothing consumption patterns during this research, the importance of contextualizing garments’ purchase, use, and disposal through the wardrobe became evident. Therefore, the later studies place a particular focus on it. In sum, in order to explore the overall question above, this thesis focuses on three issues: clothing volumes, personalisation, and the wardrobe. These topics play a different role throughout the six studies compiled in this thesis; some articles focus mainly on one of them, while others touch upon two, or all.

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The thesis is organized as follows; Chapter 1 discusses the relevance of clothing volumes, the methods and approach used throughout the studies, the relationship between them, and a glossary defining main terms. Chapters 2 to 6 correspond to five of the six individual studies included in this thesis. An exception has been made for Study 1 - an account of clothing volumes in circulation in the Netherlands and other countries in the region - which has been attached as an appendix due to its length. Finally, Chapter 7 summarizes the findings from all studies, reflecting upon their implications for the research question. Can design actually contribute to lower clothing volumes? Are personalised products enabling a positive transition? What is the role of the wardrobe in this context? Moreover, it discusses the contribution of the findings for the field of sustainable design research, reflecting on how choices in term of methods and approach led to original and significant knowledge. In line with such discussion, this chapter closes with recommendations for practitioners and suggestions for future research paths. Readers interested in a quick read over the studies are advised to focus on sections 1.4 and 7.1.
1.2 Why clothing volumes?

Accounts of the environmental burden of the apparel sector have surpassed technical and scholarly literature and trickled into popular media. Public attention to this issue may be explained by the fact that (this being the “second most polluting industry” or not) the rapid changes in the sector since the 1980s are visible to all. The production of garments is now based in countries with low wages and shipped all over the world (Schor, 2005), prices have fallen relative to other consumer goods (EEA, 2014) and the launching of new collections has speeded up (Tokatli, 2008). As a consequence, demand has grown (EEA, 2014), as have the volumes of textiles disposed of. The international second-hand trade is overflooded and used textiles are struggling to find an environmentally-sound destination (Ljungkvist, Watson and Elander, 2018). Rising volumes of virgin materials are needed to fuel this industry (FAO/ICAC, 2013), as are the resources necessary for the production and finishing of products, distribution and retail, and post-consumer textiles processing (e.g. Roos et al., 2015). In short, the apparel sector has a problem of volumes, with some estimations reporting growth in the worldwide volume sold between 2000 and 2015 by 100% (Euromonitor in Ellen MacArthur Foundation, 2017), while global population grew by around 20%.

Some companies and governments have intended to mitigate the environmental burden of growing clothing volumes by, for example, using less harmful materials and production processes or recycling post-consumer textiles. However, these efforts have been hindered by the steep growth in production volumes. The sector seems to be under the effect of what environmental economists call the Jevons paradox; that is, an improvement in resource use per product, while increasing demand for products outruns savings and the overall resource use grows. “Attempts to lessen the net impact of the fashion sector have been eroded by an increase in the number of garments in circulation” states sustainable fashion pioneer Kate Fletcher (2015b, p. 20). However, straightforward actions to reduce clothing production volumes are rare.

For instance, in the UK, governments and companies signed an industry-wide commitment to reduce the environmental impact of the whole clothing supply chain through better selection of fibres, less impactful laundry and more textile recycling. An intermediate balance of the commitment’s results published in 2017 highlights savings in carbon emissions (10.6%), use of water (13.5%), and waste (0.8%) per ton of clothing sold since 2012. But given growth in the total tonnage sold in the same period by 19%, the absolute impact of the sector increased (WRAP, 2017). Although the report favours actions to extend garments’ useful lifetimes and acknowledges that environmental savings in longer-lasting garments happen “only if new purchases are avoided”, the authors do not make the next step in recommending a reduction in production or demand (WRAP, 2017, p. 11).

In fact, product lifetimes and speed have a much stronger presence than volumes in sustainable fashion scholarship. For example, Clark (2008) has argued for the value of slowness in the fashion sector, Laitala and Klepp (2015) have studied clothing lifetimes and reasons for garment disposal in detail, Cooper et al. (2013) have provided comprehensive design guidelines for clothing to remain materially wearable, and Fletcher (2012) has acknowledged
the limited influence of designers’ intentions and material characteristics in the actual lifetime of garments, focusing instead on the experience of wearers in social context to examine and enable clothing durability. By addressing clothing longevity and durability, and the value of slow fashion as opposed to fast fashion products, such scholarship implicitly engages with volume. It considers growing quantities in the context of production and consumption acceleration. But speed and volumes are not interchangeable, because clothing purchases are rarely based on replacement (see e.g. Evans and Cooper, 2010 for a study including footwear).1

Focusing on speed leads to regarding product lifetimes as if they had environmental impact, when it is clothing production that poses environmental challenges. Studies estimating the environmental burden of clothing along its lifecycle have led to diverse conclusions about the significance of the production or use phase, for disposal is mostly found insignificant. While several studies focus exclusively on production, other cradle-to-grave assessments show that the use phase is more impactful (see Chapman, 2010 for a review). Yet, the latter are mostly based on frequently washed garments, such as cotton T-shirts or polyester blouses. Therefore, a more recent study has included a variety of garment types and materials to conclude that production is the most impactful phase (Roos et al., 2015).

In this context, the environmental benefits of lifetime extension are usually computed as savings in production. But stating that “extending the average life of clothes by just three months of active use per item would lead to a 5-10% reduction in each of the carbon, water and waste footprints” is misleading, because delaying disposal per-se does not result in environmental gains (WRAP, 2012b). This percentage is calculated by assuming delay in the production of new clothes; however, new garments are not manufactured in order to replace disposed ones. By acknowledging the conceptual difference between speed and volume and focusing on the latter, this thesis aims to contribute to an effective transition in the sector.

Confronting consumerism from a volumes perspective implies enabling reduction of demand, so that production rates fall. In that sense, the meaning of the word “consumerism” in this thesis is different than in other sustainable design-related work. For example, Ehrenfeld (2008), Fletcher (2015a), and Thorpe (2012) stress the value of design to confront consumerism by creating alternative relationships between people and things, providing opportunities for empowerment and long term wellbeing independent from purchases. In such scholarship, the political aspects of consumerism are stronger. In this research, on the other hand, the focus on volumes brings a more concrete connotation. At the same time, the question of design’s ability to confront this issue becomes more provocative, because providing alternatives may not be

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1 Chapters 5 and 6 elaborate on this issue.
enough to reduce production and consumption volumes. The question remains if designing other ways of engagement with products brings any concrete environmental improvements.²

In any case, confronting consumerism implies questioning economic growth as a ubiquitous positive force, and this may explain the lack of actions aimed at reducing volumes from companies and governments mentioned above. In line with Jackson (2009) and Raworth (2017), a focus on lowering production volumes builds on the notion that the wealthiest nations have reached a point where consuming more clothes does not contribute to our wellbeing.³ The benefits that growing material production can bring to our economy come at a much higher cost for our quality of life, that of our children and of other human and nonhuman inhabitants of this planet. It is only by placing production volumes at the core of the sustainable fashion agenda that the exponential growth of the sector’s impact can be reverted.

### 1.3 Overall methods and approach

This thesis advances knowledge in the field of design for sustainability. Since the object of study is clothing, the research can be placed within the sub-field of sustainable fashion. However, the compiled studies build on a wider scholarship and many of the issues discussed are applicable to other product categories. Therefore, I would argue that this is a contribution to the field as a whole.

Throughout these studies, I have intended to contribute to this field using an **engaged (but independent), critical, and multidisciplinary** research approach. In other words, I have carried out this research with my heart rooted in this field, my eyes watching from a distance, my brain examining issues that seemed overlooked or underdeveloped, and my hands searching for the right tools across academic traditions in order to advance relevant knowledge.

An **engaged** research attitude in this context means that I am committed to finding ways in which design can enable a better world, by reducing the impact of human activity on the environment. While highlighting the significance of this task, I do not argue that I have found ways to do that. But I have helped to get closer to this aim by reflecting on how this task has been undertaken by others, and emphasizing the paradoxical nature of the question about design and consumerism. This **critical** reflection about the state of the art in sustainable fashion was made possible by the institutional setting and supervision team involved. Carrying out this research **independently** from the scholars and organizations that are most influential in this field provided a high degree of freedom to develop original viewpoints and creative approaches to advance relevant knowledge.

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2 Chapters 2 and 5 elaborate on this issue.

3 According to Jackson (2009), in the richest nations the relationship of prosperity with economic growth has been broken, therefore GDP is not a suitable indicator of quality of life. In order for humanity to “flourish in the context of ecological limits” we need to place other indicators of wellbeing at the core. For Raworth (2017), this does not mean to strive for economic stagnation, but to dare to discuss the limits of growth and seek for more meaningful ways of thinking that take the role of energy and nature’s resources into account.
These conditions naturally demanded extra attention to the content and proactivity to stay connected to relevant networks. But, on the other hand, it enabled a **multidisciplinary** approach supported by the supervisors' solid background in different academic traditions. The studies that follow take advantage of this variety, they explore issues of interest using methods rooted in the humanities (considering clothing as social and cultural artefacts), exact sciences (emphasis on empirical research and quantitative methods), and research through design (using design for knowledge generation). This was possible because the phenomena studied did not fit exclusively in one of these traditions.

Methodological choices were made along the way, considering their feasibility and appropriateness to cover emerging knowledge gaps. For instance, the historical research in Study 3 developed from claims about the environmental advantages of personalised products and production on demand in connection to a return to the values of pre-industrial times. Given that there was no consensus about the impact of the ready-made apparel industry in personal dressmaking practices in historical literature, the study intended to find answers by reviewing local historical data. Similarly, the empirical methods employed in Study 5 were developed in response to the lack of evidence about the impact of the design strategies identified in Study 2. In this case, a detailed analysis of the relationship between different kinds of garments and their users’ consumption behaviour was found most suitable. Lastly, the systemic perspective applied in Study 6 was considered appropriate to explore the complexity of clothing consumption emerging from the findings of Study 5.

In most of the studies (both quantitative and qualitative), depth was chosen over breadth while defining the size of samples or number of cases to be discussed.

Overall, the studies employ a combination of traditional research methods such as systematic literature review, analysis of available statistical data, interviews and archive research, with more original ones, such as in-depth analysis of textile waste, complete wardrobe audits, comparative analysis of clothing age and usage, wardrobe inflow and outflow over time, and design/discussion of fictional services. In most of the studies (both quantitative and qualitative), depth was chosen over breadth while defining the size of samples or number of cases to be discussed. This is because the studies generally explore a question or perspective that was not previously investigated, so a preliminary understanding of the issue at stake is of value even if based on small samples. The available time and resources to develop each study obviously played a role too.

For example, in Study 1 the project team visited 50 inhabitants of the Netherlands and counted all the clothes in their possession, asking about specific items that had not been worn in the last year and items that had been previously owned by others. Only one previous study with similar aims had been conducted and this was based on respondents’ estimations collected
via phone interviews. The results of our research confirmed that the actual number of items owned is far from the estimation of respondents. Therefore, visiting respondents at home and supervising the counting process, even if time-consuming, was a condition for achieving more accurate estimations. It was impossible to develop such a study with a representative sample of the Netherlands; therefore, the team selected participants of varied age, location, and gender to get closer to actual averages.

Similarly, Study 4 compares how two groups of women dealt or deal with their clothes in the 1950s and 2010s; considering both means (technological, material and bodily aspects) and ends (symbolic values and ideals, among other aspects). The interviews were conducted individually with each of the 22 participants. The resulting article argues that the role of clothing has shifted in a paradoxical way during these 60 years. Although these women cannot be considered representatives of a whole generation, this claim is based on aspects that were largely shared within groups, while differing to a great extent when both groups are compared, leading to somewhat sound generalisations.

The interviews conducted with textile collectors and sorters for Study 1, the analysis of 200 kg of textile waste for the same study, the 40 wardrobe audits and 20 company interviews in Study 5, and the selection of designers, experts and wardrobe users for Study 6 followed a similar criterion. Namely, that of getting enough information to discuss specific issues in depth from a relatively small sample. This approach ensured the feasibility of individual studies within a project that aimed at methodological variety.

In fact, multidisciplinarity was a core motivation since the start of the project. This research was developed with the interest of conducting critical inquiry through all three academic traditions, exploring how different ways of doing research could complement each other, conflict, or overlap along the way.
1.4 Rationale of the studies

Figure 1.1 gives an overview of the studies compiled in this thesis. The first study is an account of clothing volumes circulating in the Netherlands and neighbouring countries (Study 1 in Appendix 1). The data summarized in the report includes figures on purchase, use, and disposal. This preliminary research confirmed the importance of reducing production volumes in order to diminish the impact of the sector. Consequently, Study 2 reviews existing design strategies that pursue this end. The review indicated that product personalisation is the strategy most frequently mentioned in literature, although its effects have not been previously evaluated. One reason for clothing personalisation having a strong presence in sustainable fashion literature is its relation to emerging models for flexible production on-demand. From this perspective, digital design and manufacture enable new production models that promise to bring about a more sustainable sector. These assumptions are discussed in Study 3, in a historical analysis of apparel production systems. A second historical study (Study 4), searches for the value of uniqueness in clothing across generations. Uniqueness is a key feature of personalised garments and one that was ubiquitous just 60 years ago, but has bordered extinction in contemporary Europe. The study discusses a two-layered historical process during this period that goes beyond simple homogenization and that is useful to contextualize the current resurgence of personalisation.

A main outcome of the literature review in Study 2 was that the effect of sustainable design strategies aimed at reducing clothing volumes is largely unknown. Therefore, Study 5 advances knowledge in that area. It empirically assesses the environmental advantages of personalised garments by comparing their performance with ready-made garments. The expected differences in the performance of these garments were not observed empirically, because clothing consumption practices are more complex than is usually assumed. The strategies reviewed in Study 2 tend to overlook that garments operate within a particular system: the wardrobe. Consequently, Study 6 aims at understanding these practices better by uncovering the structure and behaviour of the wardrobe as a system. It proposes a map of the wardrobe which enables a discussion of possible actions to reduce clothing demand.

In the published version of these studies (see Chapters 2-6 and Appendix 1), the emphasis of texts and the language used may differ slightly from the ones described here. These differences are due to the stage of the research at the time, the co-authoring process, or the profile of the supporting journals or conferences. This section, on the other hand, stresses their significance for the overall thesis.
In Figure 1.1, the studies are distributed in a triangle cornered by the three main topics of research: clothing volumes, personalisation, and the wardrobe. The position of each study in the map indicates conceptual proximity to the topics. The relations between studies are represented by solid connecting lines. Lastly, the grey areas indicate the disciplinary roots of the research methods and approach involved. The blurred limits of these areas suggest that they are relative; that the spots and their names - exact sciences, humanities, and research through design - should be seen as aids to understanding differences in language, research attitude, or kind of publication between the texts rather than disciplinary claims. The focus and context of each study are briefly described below.

**Study 1 (Measuring the Dutch Clothing Mountain)** is a reaction to the lack of reliable and local data to contextualize clothing volumes. Given that the need for information was acknowledged by other organizations, I put together a consortium of six parties and a research proposal for a project that would start covering this knowledge gap. The proposal was granted funding and the team carried out research based on the analysis of available statistical data on clothing purchase (volume and value of clothes bought in the Netherlands, their developments during the last 15 years, and comparisons with other countries in the region), 50 wardrobe studies to discuss clothing
use (wardrobe sizes, garment types, and presence of unused and second-hand clothing), and literature review, analysis of statistical data, interviews with post-consumer collectors and sorters, and a detailed examination of 200kg of separately collected post-consumer textiles to gain insight into clothing disposal (volumes of clothes disposed of in the Netherlands, developments in the last seven years, and comparisons with other countries in the region, including characteristics of the garments disposed and their destiny).

The resulting report (see Appendix 1) is a complete introductory source to the environmental challenges of the Dutch apparel sector. It presents reliable data that can be used to develop actions promoting environmental improvements in the sector, with a specific focus on clothing volumes. The issue of growing clothing volumes has become problematic across Europe, a relative fall in prices has resulted in large parts of the wardrobe unworn (28% in the Netherlands), minor reuse of garments (6% in Dutch wardrobes), and increasing volumes of textile waste that are struggling to find environmentally-sound destinations. These results emphasize the importance of actions aimed at reducing new product demand and are therefore introductory to Study 2.

**Study 2 (Reducing clothing production volumes by design)** is a literature review published as a conference paper (Product Lifetimes and the Environment international conference). The review helped to identify strategies proposed by sustainable fashion designers and researchers to tackle clothing volumes and to confirm that product personalisation is the most significant strategy in the field. Moreover, it enabled a deeper understanding of the expectations of designers and researchers on the impact of this strategy, and confirmed the lack of studies observing its actual effects after it is put in practice. The collaboration with an expert in sustainable design for this paper, and its publication at this specific conference, roots the research deeper in the field of design for sustainability. The framing of this publication in the “exact sciences” area is based on a main conclusion of the article: the lack of empirical research in the field. In Fig 1.1, this publication is connected to two research paths, leading to Studies 3 and 5, as discussed below.

The relation with **Study 3 (On paradigm shifts and industrial revolutions)** is based on the centrality of arguments connecting personalisation and sustainability in the discourse of Industry 4.0. Digital tools are increasingly enabling flexible manufacture facilities that produce custom-made clothing. According to the discourse of the fourth industrial revolution in the apparel sector, this shift can contribute to reducing mass manufacture of clothing to what is actually wanted by consumers, localizing production and avoiding waste. In this article, this possibility is studied in historical context. The outcomes were shared at the annual conference of the International Foundation of Fashion Technology Institutes. The overlap of “humanities” and “exact sciences” approaches in this study is based on the use of available socio-economic statistics for the historical analysis.

The environmental claims of Industry 4.0’s discourse in fashion are largely based on the historical role of personalised products. From this perspective, flexible manufacture enables a return to the uniqueness of custom-made clothing, and a reconnection between people and their clothes, a relationship that the
massiveness of ready-made clothing had previously broken. Study 4 (From “things of imitation” to “devices of differentiation”) explains these issues in historical and theoretical context. It analyses the changing value of uniqueness and sameness since the mid-20th century and a parallel and paradoxical shift in the materiality of clothes, contextualising the current resurgence of personalisation. This article, co-authored with a fellow researcher, is based on a series of interviews with women from two different generations. The text emphasizes the theoretical implications for the field and it is published in Fashion Theory: the journal of dress, body and culture.

Study 2 called for empirical validation of design strategies for lower clothing volumes. Consequently, a second research path emerging from it leads to Study 5 (Assessing the impact of design strategies on clothing lifetimes, usage, and volumes), which proposes quantitative methods to test the effect of these strategies, and applies them to the case of product personalisation. The study evaluates the environmental gains of personalised garments by comparing their performance with ready-made garments in terms of age, usage, influence on new product demand, and waste. Given that the relationship between personalisation and volumes is mostly assessed through wardrobe studies, the publication is placed at the centre of Figure 1.1, equally distant from “clothing volumes”, “personalisation”, and “the wardrobe”. This specific study was developed over an extended period of the PhD trajectory. The resulting article is co-authored by all PhD supervisors and has been published in the Journal of Cleaner Production.

A secondary finding of the research above is that clothing consumption follows different mechanisms to the ones expected by design strategies, because garments in use are part of a broader system: the wardrobe. Therefore, the next and last study compiled in this thesis, Study 6 (The wardrobe as a system), offers a new perspective on clothing consumption by acknowledging the systemic nature of the wardrobe. In order to explain some of the mechanisms observed in the previous studies, we facilitate a creative session and a discussion group based on fictional “smart wardrobe” services. By reflecting on the results, we give shape to a preliminary map of the wardrobe that describes some characteristics of clothing consumption. Moreover, the map is used to discuss actions aimed at reducing clothing volumes, connecting back to the starting point of this thesis. The emphasis of this study on the wardrobe and the particular research approach place it at one corner of the research map. This publication is co-authored by one PhD supervisor and has been published in the Journal of Design Research.

While in Figure 1.1 the six studies are clearly framed by the three topics, these topics were also reformulated on the basis of the studies and their findings. These processes, represented in the figure by dotted arrows, were central in designing the remaining studies and in redefining the overall research along the way, as explained below.

The question that gives title to this thesis has been in my mind for more than 10 years, but it was during Study 3 that the centrality of clothing volumes became apparent. Despite a few exceptions in periods of war or economic crisis, production quantities have been always on the rise. How could designers, then, counter this force by creating more stuff? Placing a straightforward focus
on product volumes (rather than lifetimes, object-user relationships, or other related issues) revealed the paradoxical nature of this question and helped to clarify the object of study.

Similarly, readers may notice the centrality of clothing personalisation in Studies 4 and 3, and even in Study 2. However, it is not until Study 5 that this term is used. The initial stages of this research focused on practices of user participation, co-creation and co-design, emphasizing the differences in the processes and products resulting from them. Among these practices are the historical examples of custom- and self-making of clothing discussed in Studies 3 and 4, and contemporary examples ranging from craft to mass customisation discussed in Studies 2 and 5. Using personalisation as an umbrella term and leaving distinctions aside helped to place a straightforward focus on what is distinctive and interesting about them: the possibility of creating individual products based on the preference of users. This chronological order may clarify inconsistencies in the terms used in the separate studies.

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Lastly, the wardrobe did not play a central part at the start of this research. However, its significance in discussing the relationship between clothing volumes and personalisation emerged while conducting Study 3, and became prominent when considering adequate methods for Studies 1 and 5. Given the key role of the wardrobe in clothing consumption dynamics acknowledged in the findings of Study 5, Study 6 embraced it as main research topic.

Having discussed the logic behind and relations between the studies compiled in this thesis, I remind readers to consider that they were written as independent articles. For this reason, chapters start with a brief reading note clarifying overlaps or conceptual differences between them. For a summary of the findings, please go to section 7.1.
1.5 Glossary

This glossary defines terms used in Chapters 1 and 7. The individual studies compiled in this thesis (Chapters 2-6 and Appendix 1), may use slightly different terms, these are indicated at the start of each section.

**Clothing / Garments:**
objects that are used to cover the human body, including those made of textiles (e.g. dresses) and other materials (e.g. shoes).

**Consumerism:**
the acquisition of goods and services in ever-increasing amounts.

**Consumption:**
the acquisition, usage, maintenance, storage, and disposal of products by their users.

**Design:**
the planning of a new image, object, or system, and the field of studies that focuses on that process and its results.

**Environment:**
the natural elements and beings with which we humans share this planet.

**Fashion:**
the field of studies or discipline that deals with clothing as material, social and cultural objects.

**Personalisation:**
the activity of designing and/or producing personalised garments.

**Personalised garments:**
 garments whose users are involved during the process of designing and/or making, this includes several kinds of self-made and custom-made products and excludes garments modified by users after manufacture.
Self-made garment: a garment made by its user from provided materials.

Custom-made garment: a garment specially made for a user by others, including companies, family members, etc.

Production / Manufacture: the materialization of objects, regardless of the technology employed or the place where they are made.

Sustainability: a scenario where humanity overcomes pressing social and environmental challenges, for example Ehrenfeld (2008) describes it as “the possibility that human and other life will flourish on the planet forever”.

Usage / Use: active engagement with an object, for example the wearing of a garment / the phase of a product life intended for usage (use phase).

Value (product value): People’s perception of a product’s worth, as in emotional or functional value. In Study 1: Monetary value, as in retail value.

Values (people’s values): Beliefs that affect the action of people and are the basis of intention.

Wardrobe: the complete collection of garments owned by a person, regardless of the place where they are stored and their usage.