

Garment Quality and Product Lifetimes

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Abstract: The fashion industry is one of the most polluting industrial sectors in the world and its environmental impacts are enormous. Garments are produced effectively, sold for a low price, have low quality, and are used for a very short time before ending up in growing textile waste streams. One critical aspect in the sustainability context is the lifespan of garments. Short garment lifespans are the result of low quality, rapidly changing trends and consumer dissatisfaction, which leads to early disposal. This study focused on the issue of garment quality and how it can be connected to product lifetime.

The research was based on a case study approach, including company interviews. It examined the companies' work on quality and aimed to make the ways in which quality impacts product lifetimes visible. The data were analysed in accordance with the principles of descriptive analysis and the discussion was further applied to the circular economy context. Five main themes were identified from the data: product and material quality, lifespan quality, quality of responsibility, quality of service, and operational quality.

Garment quality is an important factor, even in a circular economy context. Technical quality can extend the use time of a garment and even enhance the circularity of materials in the waste phase. High quality allows the products and materials to circulate in the system for a longer time. Quality is still important at the end of a product's lifespan, as high quality waste material is easier to up-cycle into new fibres. We bring the quality discussion to a new level by also examining lifetime quality in a CE context.

Introduction

Current economic and industrial systems are based on the rapid replacement of products, which means that products are no longer designed for long-term use (Niinimäki, 2011). The fast fashion industry relies on low-quality products that pass from on-trend to obsolete in short timespans. Consequently, it is estimated that this industrial sector produces 92 million tonnes of textile waste annually (Quantis, 2018), which either end up in landfills or are incinerated. Therefore, studying ways with which to extend the lifetime of garments is important. The circular economy (CE) strategy will force this industry to close the material loop. Thus, this study focuses on garment quality and how it is connected to product lifetimes, especially in a CE context.

Circular economy

The scale and speed of apparel consumption and production have multiple negative environmental impacts. The linear system (design-manufacture-sale-dispose) is not only contributing to extensively damaging the

ecosystem and causing impacts such as climate change and loss of biodiversity (Fletcher and Grose, 2011; Niinimäki et al. 2020); it is also losing up huge amounts of valuable resources and materials (Niinimäki, 2018). The CE is 'an economic model which aims to restore the value of resources, materials, and products as high as possible for the maximum amount of time, and then return the materials back to use in continuous cycles instead of generating waste, where the value is lost' (Fontell and Heikkilä, 2017, p. 9). Therefore, CE aims to extend the use time of garments instead of generating waste, as waste prevention is prioritized in the waste management hierarchy (ibid.). This presents a counter movement to the dominant linear business model in which products finally end up in landfills and lose their value. The current linear system of mass-manufacturing products in low-cost countries emphasises the cheap end-price of the product, which leads to their weak intrinsic quality (Niinimäki, 2011). Moreover, poor quality and cheap prices contribute to shortened product lifespans (ibid.).

The goal of CE is that products and materials circulate in a system of closed loops for as long as possible instead of generating waste (Fontell and Heikkilä, 2017), which also means extending products' lifetimes.

Quality

There is a lack of consensus on the definition of quality amongst researchers and consumers in the clothing field (Day et al., 2015). Despite the broad spectrum of interpretations of quality, for most fashion businesses, quality seems to be based on only very technical laboratory testing of intrinsic, physical characteristics such as fabric strength, abrasion resistance, pilling, wrinkling, colourfastness, dimensional changes, and seam slippage. However, although this industry-based approach to quality might help standardise products, it fails to recognise other views of quality, such as user experiences of the garment over the course of time (Connor-Crabb and Rigby, 2019).

Quality is tightly linked to user satisfaction with clothing over time and thus also to how long the product is used (Connor-Crabb and Rigby, 2019). Connor-Crabb and Rigby (2019) suggest that the individual, subjective assessment of garment quality affects how the clothing is worn and cared for, which then further impacts the physical condition of the garment over time. According to the authors, if a consumer considers a product to be of good quality, they care for it and its lifespan is longer. On the contrary, if consumers consider the quality of the product to be poor, its lifespan might become shorter due to lack of attention and maintenance. (ibid.)

Research design

As the goal of the study was to gain insights into how companies define and work with quality in the apparel industry, and how quality relates to product lifetimes, a qualitative case study was selected as the research strategy. The study examined three company cases and the data consisted of four interviews (Table 1). As the companies included were known to already address quality and sustainability in their operations, they were considered valuable assets for finding linkages between quality and product lifespan. The interviews were semi structured and content analysis used an inductive approach for transcriptions.

Table	Number of interviews	Size	Category
Company 1	1	Small	Knitwear
Company 2	2	Large	Children's wear
Company 3	1	Large	Workwear, rental service

Table 1. Companies in the study

Results

Five main themes were identified from the data: product and material quality, lifespan quality, quality of responsibility quality, quality of service, and operational quality. These themes are discussed below in more detail.

Product and material quality

Product and material quality were the most referred to dimensions in the interviews. Product quality consists of elements such as timeless design (a more classical look), functionality, adequate construction, and technical durability. The focus is on suitable material and construction combinations that guarantee the product's functionality, safety and performance. The companies were willing to invest in resources to find the perfect, most suitable materials for their products.

Material and product quality were tested by either extensive laboratory testing or using and washing the products in practice. All the products, materials and components could be tested using adequate ISO or EN standards. In addition, the companies considered that certifications such as GOTS (Global Organic Textile Standard), Oeko-Tex and Bluesign, and technical reports supplied by the material suppliers guaranteed to some extent that the textiles had been produced in environmentally friendly and socially acceptable ways and that they performed as expected.

Two of the companies emphasised that quality under specified limitations could not even be considered for their collections. These limitations vary depending on the product category. Different indicators are important for outdoor and indoor clothing, for example. Therefore material selection is often about meeting the technical expectations that create the base for a desired performance.

Different countries have different legislation concerning issues such as chemical regulations, and different industries have different specifications in terms of, for example,

fire safety or particle exemption. Companies need to be highly aware of these regulations and be able to provide solutions that correspond to these requirements.

Technical quality is a way in which the companies ensure the quality, safety and technical performance of their products, but simultaneously address the customer's needs and desires, and regard these as part of product quality. They pay attention to how customers experience their garments and what kind of emotions their products evoke. They use colours, shapes and product construction to arouse feelings such as joy, comfort and safety. Moreover, material quality is considered in not only the manufacturing or use phases, but also in the end-of-life stage through the aspect of recyclability. Using mono-materials was discussed and fibre blends were considered difficult to recycle. The companies highlighted the importance of considering the end of life and recovery processes already during the early stages of product development.

Lifespan quality

In regard to the relationship between lifespan and product quality, aspects such as timeless design, adequate materials and product construction, high technical quality, and functionality were considered important. In addition, two of the companies emphasised that the right product in the right place and correct use would lengthen the product lifespan.

The interviews revealed that the companies had set goals in terms of their products' lifespans. One of the companies said that their products were not designed or made for use by only one user but for use by many users. Another company estimated that their products lasted for five to ten years depending on the user and how they were used. For the third company, the goal was that their products would circulate in the system for as long as possible. One of the companies added that as they produced durable products, the products should have a sufficiently long and meaningful life. This implies that the lifespan of a product has to be in a suitable relation with its durability and the resources used to achieve this durability. These lifespan goals are important, as the longer the garment is in active use by a consumer, the more likely it is to offset the production of a new textile product and thus reduce the environmental impacts of the industry (Watson et al., 2017).

All the companies emphasised optimal care and maintenance as a significant factor for lengthening a product's lifespan. It is important to identify which products customers need, but also how they use and care for these products.

Quality of responsibility

Responsibility was also mentioned as a viewpoint on quality in all of the interviews. According to the Merriam-Webster dictionary (2020), responsibility is either obligated or free-willing acceptance of responsibility and accountability for one's actions (ibid.). According to the interviews, the companies saw responsibility as being related to the environmental, social and economic impacts of their products and operations. This also included risk management.

Responsibility means that companies are responsible for their products throughout their lifespans; also for both the close and far-reaching impacts their products and operations might have. Therefore, responsibility concerns aspects such as transparency, safety, and minimising environmental impacts and activity in the ecosystem. Some of the companies' impacts can be measured and ranked, but not all necessarily have a calculated value. Responsibility is tracked through, for example, certifications, life cycle assessment (LCA) and visiting or auditing factories to guarantee that responsibility is actualised throughout the company's processes. Responsibility is today communicated to consumers through different types of sustainability and responsibility reports.

According to the interviewees, responsibility also means gaining a significant importance in the minds of consumers. Consumers expect transparency from companies as they are concerned about the level and scope of responsibility for the products as well as the company's business in general. One of the interviewees said that consumers 'would like to follow why I am with them', which basically means that customers are looking for a reason to buy a certain brand instead of another, and responsibility plays an important role in this. Therefore, responsibility can also be a very personal and subjective matter for consumers. Companies have to control their responsibility on many levels to be able to handle risk management, especially in terms of their reputation.

Quality of service

One of the companies mentioned that the consumer experience stems from encounters with their personnel and the quality of company service, and that to a large extent, it is their consumers who define the company's quality. The quality that the customers seek is understood via well-planned sales work and communication with consumers. Companies receive consumer feedback via multiple channels. It is of utmost importance that they understand the consumer's needs in order to be able to offer suitable products and solutions that truly meet their demand.

Quality service was said to be about timeliness and accuracy. Garvin (1988) also talked about serviceability and noted that consumers are not only concerned about product failure, but also about the nature of service appointments: if problems occur, the quality of service is evaluated on the basis of complaint-handling procedures (ibid.). One of the interviewees mentioned that complaints are always handled in a way that ensures that the consumer is happy in the end and that the company does not lose them. They want to signal to their customers that they keep their 'quality pledge', their promise of certain product quality and performance.

Operational quality

Based on the interviews, quality was a comprehensive concept. According to one of the companies, it even reached operations such as recruitment, leadership and process management. This aspect of quality can be called operational quality.

Process management means that all company processes are defined beforehand and communicated inside the company. One of the interviewees highlighted that quality does not originate from testing, but from making things in the way that has been agreed. The interviewee added that each department was responsible for ensuring that everything that leaves their hands is of high quality. These comments suggest that quality is based on predefined quality goals and is realised by following these goals.

Another company reported that data management was a crucial part of their quality management. Data management enabled them to correctly store and communicate all the necessary information about collections,

materials and certifications etc.. Therefore data management played an important role in both the company's operational quality and its transparency.

Leadership involves setting goals for a company's quality and responsibility. Quality leadership also helps company employees be successful in their jobs. The interviewees said that the quality of leadership correlated with high work satisfaction, which further correlated with customer satisfaction. Leadership and employee satisfaction were measured through different kinds of surveys.

Successful recruitment highlights the role of individual employees in a company's quality. One of the companies, for example, saw that by recruiting people who had a certain environmental mindset and who paid attention to social aspects, responsibility became a natural part of the company's operations.

Conclusions

Garment quality is a complex issue, and it can be approached from many levels. This paper reveals companies' quality work by discussing garment quality from the following viewpoints: product and material quality, lifespan quality, quality of responsibility, quality of service, and operational quality.

In the sustainability context, it is essential to study the aspects of quality in more detail and to further discuss how quality is linked to garment lifetimes. To conclude this study, we apply the quality categories presented above, based on company interviews, to the context of CE, and highlight the most critical quality elements. High **technical quality** of a garment enables the product to remain in use for a longer period of time. High technical quality also enables the product to be used by several users, resulting in an extended lifespan. Moreover, if consumers believe a garment is of good quality, they care for it more, which impacts on the physical condition of the product over the course of time, ultimately extending its lifespan. These aspects can be understood as **quality in use**. Good quality matters even when the lifetime of the product is nearing its end; a material's life can be extended through fibre recycling. This can be understood as **quality for recycling**. Overall, the companies in the study perceived products with longer lifespans to be of higher quality and to have more sustainability value than those with short lifespans. Therefore, it could be stated that

garment lifetime *itself* is also one measure of quality. In a CE context, the aspect of recyclability extends the quality definition to include the second or third lifecycle of a material after the product's first lifespan is over. This aspect can be described as **lifetime quality**, which is a new category for garment quality in the CE context. Lifetime quality needs new knowledge on how garments should be designed and which materials to choose, to enable the maximum number of lifecycles and to allow each material to reach its optimal recycling path.

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References

- Connor-Crabb, A., Rigby, E.D. (2019). Garment Quality and Sustainability: A User-Based Approach. *The Journal of Design, Creative Process & the Fashion Industry* 11 (3), pp. 346–374.
- Day, C., Beverley, K., Lee, A. (2015). Fast fashion, quality and longevity: a complex relationship, in: Cooper, T., Braithwaite, N., Moreno, M., Salvia, G. (Eds.). *Product Lifetimes and the Environment (PLATE) Conference*, Nottingham Trent University.
- Fletcher, K. & Grose, L. (2011). *Fashion & Sustainability: Design for Change*. London, UK: Laurence King.
- Fontell, P. & Heikkilä, P. (2017). Model of circular business ecosystem for textiles. VTT Technical Research Centre of Finland.
- Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T. and Gwilt, A. (2020) The Environmental Price of Fast Fashion. *Nature Reviews; Earth and Environment* 1, pp. 189–200.
- Niinimäki, K. (2018). Sustainable Fashion in Circular Economy, in: Niinimäki, K. (Ed.), *Sustainable Fashion in Circular Economy*. Aalto ARTS Books, Helsinki, pp. 12–41.
- Niinimäki, K. (2011). *From Disposable to Sustainable: The Complex Interplay between Design and Consumption of Textiles and Clothing*. Aalto University, School of Art and Design, Helsinki.
- Quantis. (2018). MEASURING FASHION: Environmental Impact of the Global Apparel and Footwear Industries.
- Watson, D., Gylling, A.C. & Thörn, P. (2017). *Extending active lifetime of garments: Supporting Policy Instruments*. Mistra.