

Summary

In this thesis, I aim to domestically improve the state of circularity regarding disposable non-surgical FFP face masks. Working with RaboResearch (Rabobank), the goal is to propose a number of theoretical, feasible changes to the face mask, as well as explain why other changes may not be possible (as of now). To achieve this goal, first, the definition of circularity in the context of face masks is made clear. This is followed by a research phase, where the type of mask and its current state of circularity are broken down. Following the choice of mask, its anatomy, materials, and structure are detailed as well.

Following the research phase, I dive into opportunities for improvement, starting off with recycling options for polypropylene, the current (main) material of the mask. This is followed by looking into other options to replace the polypropylene. Since face masks contains other elements such as ear-loops and nose clamps, these are researched as well. Similar to the polypropylene, both the recycling options as well as possible alternatives for these elements are detailed. Lastly, improvements and possibilities to the systems surrounding face masks are discussed, namely recycling availability and alternatives to disposable face masks altogether.

Conclusions are drawn to show that there are a number of possibilities to improve the circularity of non-surgical FFP face masks. The recycling of masks is a rather unexplored topic in the academic world, but the research has shown that even small changes can undeniably make the masks more circular. Examples include replacing aluminum nose clamps with polypropylene clamps or separating the masks' materials using a chemical process rather than a manual one. In addition, the act of recycling face masks on a national scale can be made much more approachable and impactful if the reprocessing of single-use medical materials was legalized, and if guidelines or programs regarding mask collection were to be set up.