

SuperFlex Final publishable summary report

Personalization of consumer products is no longer a passing trend. The customization approached stemmed from deep objective and subjective motivations. The efforts to introduce personalized skincare to markets are based on understanding of our individual diversity and the prospects of more effective solutions to meet the special skin's needs of a "one man syndrome". This customization approach is fabricated in SuperFlex project, which aims to develop and demonstrate a 'Mini-factory' concept for production of personalized skin care products for benefit of elderly people. This segment is dramatically growing in European population, suffers from skin alterations disrupting quality of life and hence, possesses significant economy value.

SuperFlex project proposes a novel flexible customized skin care approach for better performing skin treatment, combined with cost reduction of 30%, significant reduced environmental impact and a 50% reduction in time to market. These major goals were fully achieved within project period by manufacturing and treating elderly people with personalized skincare products:

- **100% of 30 participants in clinical study had positively graded their customer's satisfaction for the personalized treatment and service.**
- **The majority (77%), of personalized treatments were measured by dermatologists as effective.**

Four integrated operational modules had been involved in SuperFlex achievements:

1. Mini lab module for "one man syndrome" personalized skin analysis – operating portable device of mini-lab for non -invasive and direct quick measuring (5-12 minutes for all tests) that can be connected to the mini-factory and further optimized by adding other measurements modularly.
2. Decision Support system (DSS) to process input personalized skin parameters - generating an individual skin profile based on an array of skin objective measurements, integration with costumer preference and historical background for suggesting personalized skincare treatment. By post treatment feedback and self-learning algorithm the system can be further optimized for personalization.
3. Mother factory and Mini-factory Manufacturing system for personalized products production - splitting the complete manufacturing process to concentrated bases in the mother factory and final individual customized production by additives addition in a mini-factory performed via a patented simple mixing technology, which takes 10-20 minutes.
4. Cyber-Physical Production System (CPPS) for cross modules data communication and integration - characterized with high degree of automation, flexibility in manufacturing process, remote management and maintenance, process traceability. This assures interaction among the different sub-systems for ensuring manufacturing of personalized skin care product for each new customer.

Additionally to these operational modules, SuperFlex deals with several aspects for assuring successful implementation:

- Logistics and costing – Cost reduction was achieved via the reducing the number of beneficiaries involved in product's long process from manufacturer to customer and pricing mark-up, decrease of stock values and warehousing prices due to changing supply chain to "just in time" (per order), saving transportation costs due to deliver the concentrated base to the mini-factory, shorter shelf life of 6 months instead of 3 years, no need for secondary (carton box) packaging
- Regulation - in order to comply with the same standards and guidelines of EC Reg. 1223/2009, the mini-factory process for personalized products are defined to cope with some challenging regulatory demands, in particular registration and licensing of pre-defined range of additives.

- Environmental impact – A full LCA LCC analysis of the validated whole Superflex process according to distributed manufacturing model was performed in comparison to the centralized manufacturing model currently applied in the cosmetic industry, proving the sustainability enhancement of skin care products and the reducing manufacturing of 30% w.r.t. the centralized model. This analysis is one of a kind for the cosmetic industry and furthermore, for personalized cosmetics

SuperFlex achievements provide a pivotal platform for personalized cosmetic manufacturing and pave the way for further commercialization of the different operational modules. Moreover, SuperFlex manufacturing platform proposes unique and practical solutions for different challenges in regulation and costing, thus it can be leveraged and exploited in different business models.