

Specifically the goals of HINMICO are to develop:

A) Fast and precise  $\mu$ -replication-assembly processes with new tooling concepts/designs for processing high quality miniaturised multi-material parts and to fabricate:

- 3D multi-material  $\mu$ -components (sensing actuator, dental implant ...) using advanced materials/ sub-components with improved interface designs between them, by  $\mu$ -Injection Moulding with sub-mm resolution.

B) High-throughput process chain by the integration of the above mentioned  $\mu$ -replication-assembly and back-end processes for product finishing or a complementary activation step, to fabricate multi-material functional devices:

- Integrated processes based on Micro-replication (over-moulding, in-mould assembly, packaging) utilising modules of e.g.: coating, laser welding, laser direct structuring... ,with the goal to perform the necessary steps for obtaining finished products or provide functionality to m-devices, such as conductive coatings or functionalized packaging;
- High speed and precision handling system for delicate  $\mu$ -parts (components and sub-components) which covers the core of the integrated processes chain, including the feeding and accurate allocation in mould of in-lay parts (parts/inserts to be over-moulded/assembled/packaged) and the placement of the injected multi-material components on the next stages within the process chain.

C) Global process chains with increased reliability (50%) and fabrication of high quality products.

- This requires on-line process monitoring and innovative on-line process inspection solutions.

D) High added value  $\mu$ -devices with advanced functionalities:

- The integration of high accuracy replication of multi-material functionalized components

and back-end processes for additional functionalities will enable the introduction and combination of properties like enhanced bio-compatibility with drug delivery, conductivity with non-conductive, etc,...the possibilities of the high-throughput integrated technologies for the production of multi-material functional  $\mu$ -components will be validated through 5 industrial demonstrators in 3 different sectors (health, communications, automotive).