KYKLOS 4.0

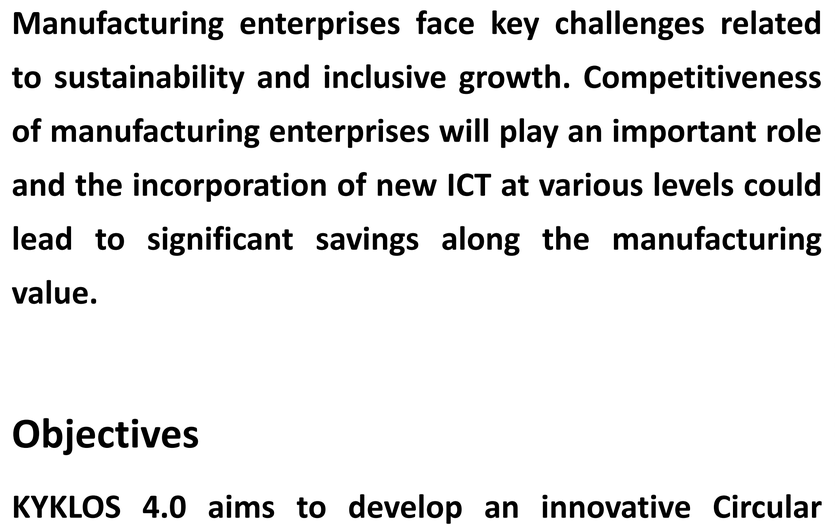
An Advanced Circular and Agile Manufacturing Ecosystem based on rapid reconfigurable manufacturing process and individualized consumer preferences

Problem

Manufacturing enterprises face key challenges related to sustainability and inclusive growth. Competitiveness of manufacturing enterprises will play an important role and the incorporation of new ICT at various levels could lead to significant savings along the manufacturing value.

Objectives

KYKLOS 4.0 aims to develop an innovative Circular Manufacturing ecosystem based on CPS and AI technologies, enhanced with novel production mechanisms and algorithms, targeting on personalized products with extended life cycle and promoting energy efficient and low material consumption intra-factory production processes, resulting reduced greenhouse gas emissions and air pollutants.



KYKLOS 4.0 high level architecture

KYKLOS 4.0 aims at providing an Ecosystem which creates and supports the configurations, methodologies, production techniques, decisions and actions at all different levels and stages of the equipment manufacturing value chain so as to achieve the goals of

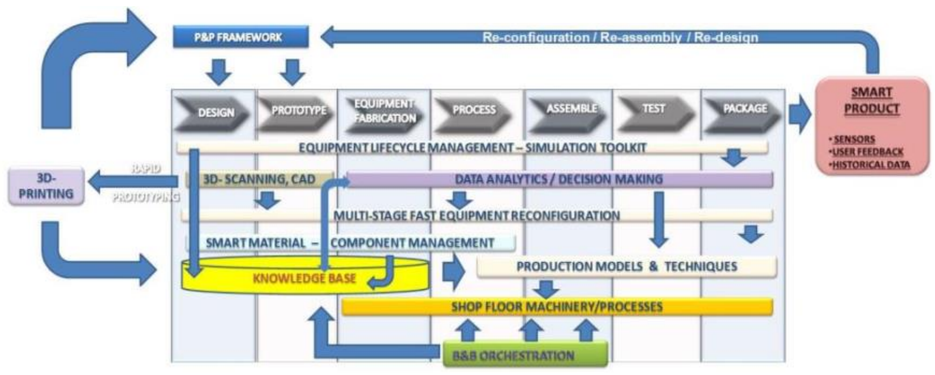
1. **increased energy efficiency,**
2. **decrease of raw material through to the second use of parts or material (including waste from manufacturing process),**
3. **customer centricity,**
4. **on-demand manufacturing and**
5. **best meet the Industry 4.0 objectives**

KYKLOS 4.0 Concept and approach

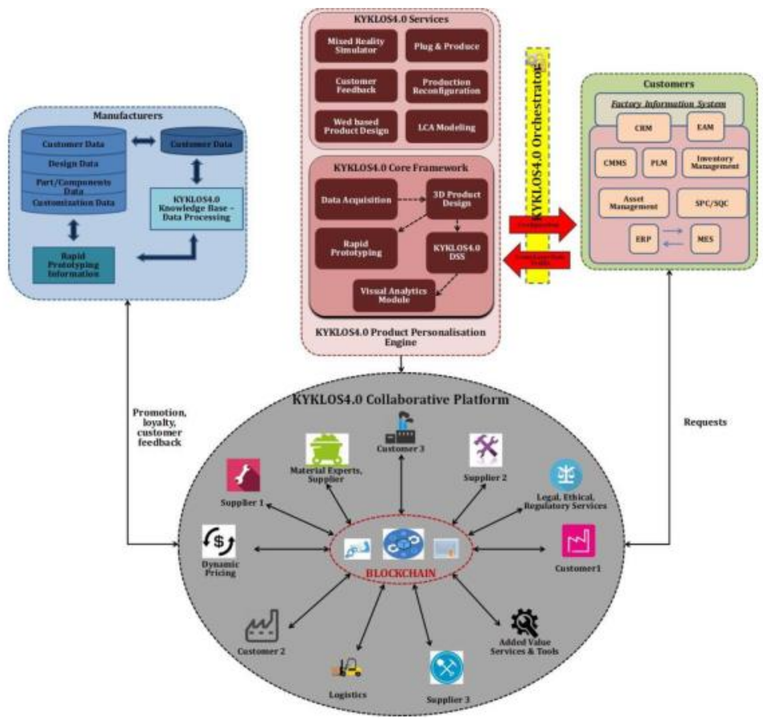
KYKLOS 4.0 aims at providing a system which automatically and autonomously creates the configurations, methodologies, production techniques, autonomous decision making processes and actions at all different levels and stages of the manufacturing value chain.

KPIs, strategic and operational goals

- **reuse and/or re-configuration of**
- **custom products/components**
- **ensuring timely and successful product creation through shop-floor ready maintenance and in-process monitoring and control**
- **decentralized predictable and resilient CPS and advanced AM simulation services / modules.**



KYKLOS Logical Flow Diagram



KYKLOS 4.0 Collaborative Platform

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The end-user interacts with a virtual marketplace which includes all the available services from different factories.
KYKLOS 4.0 Marketplace will allow users to:

- **Place their requests**
- **Receive recommendations**
- **Monitor the status of services**
- **Keep track of Service Level Agreements**
- **Receive real-time notifications**
- **Monitor new virtual production lines**
- **Obtain early diagnosis by AI software**

KYKLOS 4.0 Transformable Manufacturing System

Distinct subsystems, aiming at achieving flexible and easily repurposed / reconfigured production lines, by applying transformable robot system on KYKLOS 4.0 shop floor.
These subsystems involve:

- **A Cognitive Learning Toolkit able to learn new assembly and configuration skills.**
- **An Automated Task Planner Toolkit able to facilitate higher level task planning.**
- **A body-worn computer able to track motion, recognize faces, detect passive objects and overlay them on the shopfloor.**

KYKLOS 4.0 Transformable Manufacturing System

Expected Impacts

- **Significant increase in the options for SMEs and mid-caps to integrate different technologies, unlock the value of their data, deploy complementary applications, and to become a more responsive link in changing supply and value networks.**
- **Strengthened competitive position of European platform providers.**
- **Increased cooperation between industrial and academic communities; increased synergy and collaboration between projects.**

Project Partners

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