Publishable summary

Grant Agreement number: 609143

Project acronym: PROSECO

Project title: Collaborative Environment for Design of AmI enhanced Product-Services Integrating Highly Personalised Innovative Functions with Minimal Ecological Footprint along Life Cycle and of Their Production Processes

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ProSEco provides a novel methodology and a comprehensive ICT solution for collaborative design of product-services (Meta Products) and their production processes.

The effective extension of products with new services in different sectors (automotive, home appliances, automation equipment etc.) will be achieved by means of Ambient Intelligence (AmI) technology, Lean and Eco-design principles and applying Life Cycle Assessment techniques.

New Meta Products using AmI, will be capable of acquiring knowledge in order to add highly personalized innovative functions, and thus enabling new business models. A Cloud Manufacturing approach is used for effective collaborative design of product-services and their production processes, and the effective implementation of innovative services. As a result, new eco-innovative Meta Products are offered, which integrate highly personalised innovative functions with minimal environmental footprint along the overall Life Cycle. ProSEco offers a development platform and a set of new engineering tools to support collaborative work (simulation, configuration etc.) on new product-services, enhancing existing tools for product/process design

The project has been driven by four industrial application scenarios addressing different aspects of service and business building as well as product/process development (complex internal and external supply chains), in order to assure that the means for collaborative service generation and product-service and production process design to be developed in the project will be relevant for industry. The solution will be first applied at 5 manufacturers in the consortium (Desma (DE), Ona (ES), Electrolux (IT), Volkswagen (DE) and Alberdi Mekanizatuak (ES)), serving as demonstrators of the project results.

Meta-products comprise physical goods and physical services with emergent personal functionalities, which are based on the automated intelligent collection and processing of personal data as physical goods and services are used. As much of the value of meta-products resides in data in the Cloud, meta-products have great potential for international marketing and sales.

We are immersed in the wave of Factories of the Future. One the main topics is Servitization in industry 4.0. Servitization as a strategy to answer the pressure of the global markets in order to move the competition from costs to sophistication and innovation.

Nowadays manufacturers are forced to shift from their traditional product-manufacturing paradigm to the goods-services continuum by providing integrated combination of products and services. The adoption of service-based strategies is the natural consequence of the higher pressure that these companies are facing in the global markets especially due to the presence of competitors which operate in low wage region

The proliferation of new emerging technologies and paradigms together with a wider dissemination of information technology (IT) can significantly improve the capability of manufacturing companies to infuse services in their own products.

This can be enabled by making use of sensors and actuators already within existing physical goods; by adding them to existing physical goods; and/or by selling new physical goods. Technological developments from the EU ProSEco project enable the fulfilment of the huge marketing potential of meta-products by extending their scope and improving their technical performance.

The effective extension of products with new services in different sectors (automotive, home appliances, automation equipment, etc.) has been achieved by means of Ambient Intelligence (AmI) technology, Lean and Eco-design principles and applying Life Cycle Assessment techniques.

The objective of the ProSEco project has been to provide **a novel methodology and a comprehensive ICT solution** for collaborative design of product-services (Meta Products) and their production processes.

ProSEco focuses on the capture and exploitation of customer side relevant information related to the use of the product or machine and its environment (by means of Ambient Intelligence (AmI) technology, context awareness, eco-impact assessment, etc.) to create better and new services in combination with the product (so-called servitization).This enables the creation of new business model providing more value to the

customer, to rapidly response to the competitive economic climate and respecting the environment at the same time.
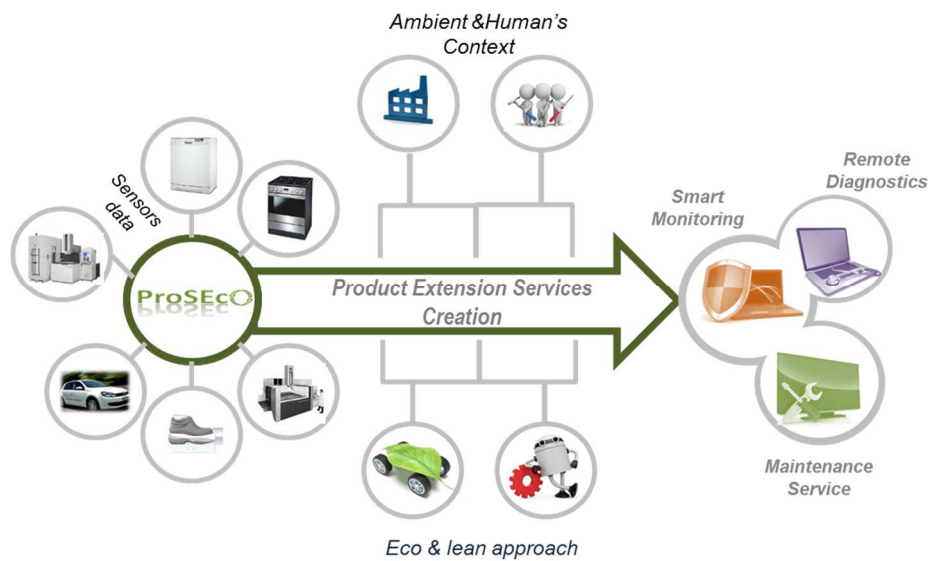

Figure 1.: ProSEco in a nutshell

The **Integrated ProSEco Prototype** supports industries in collaborative design, development and management of new Product Extension Services (PES). It provides two working environments, the development and the deployment platform that requires different type of knowledge expertise and IT capabilities.

A **Meta Product/process** development platform has been provided, including a set of new engineering tools to support collaborative work (simulation, configuration, etc.) on new product-services, enhancing existing tools for product/process design. The platform is a set of s**et of ICT tools:**

- Integrated **Collaborative Development Environment**
    - Collaborative Portal, Eco-tool for impact assessment, Market Simulation Tool, Configuration of new Product Extension Services,.AmI Selection Tool, Data Mining Tool, Context Modelling Tool, Security Tool and Service Composition Tool.

- Integrated **Runtime Deployment Platform**
    - to manage the execution of a Product Extension Services (PES) in the Cloud by using the Secure Runtime Infrastructure and a set of core services and application specific services.

A Methodology comprising a set of practical guidelines for organisations on how to develop Product Extension Services and how to prepare their business for introducing the Product Service System paradigm taking into account sustainability and eco-impact of the new services.

In Figure 2 it's described a ProSEco customer journey. It starts with the product virtualization, creating an avatar of the product/process. Then using the ProSEco Collaborative Platform the new PES is designed and created or (updated). The use of the new PES (i.e. Smart monitoring, remote diagnostic, etc.) is possible thanks to the Deployment Platform.
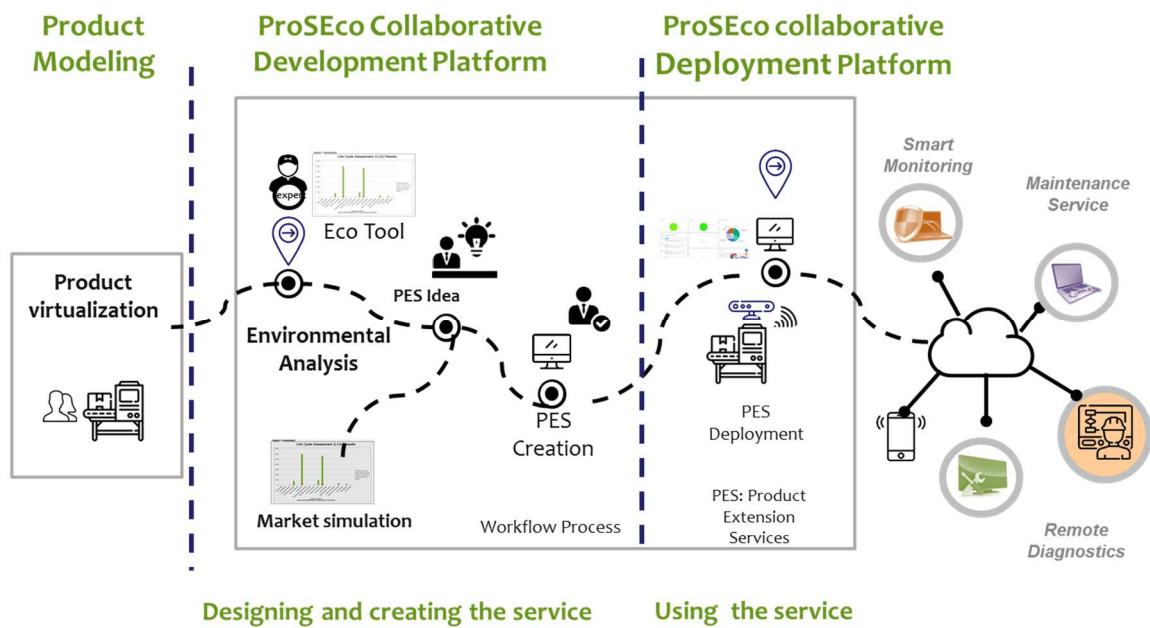
Figure 2.ProSEco Journey

The entry point to design and create new services is the Collaborative Development Platform (Figure 3) that provides access to the product configuration or modelling, the engineering tools, and the workflow to design and create a new PES.
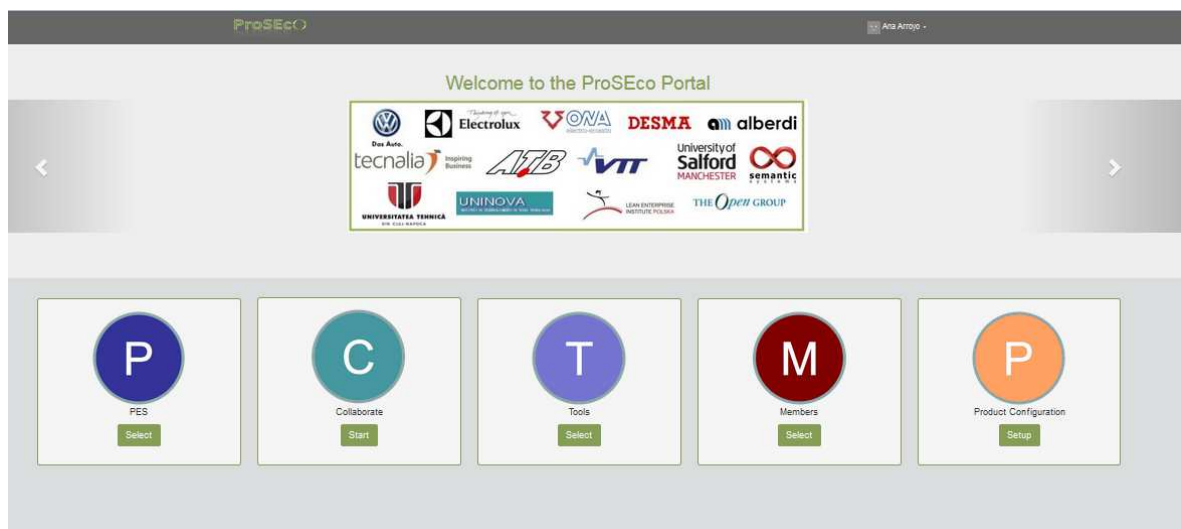

Figure 3.: Collaborative Development Environment

The project has been driven by four industrial application scenarios addressing different aspects of service and business building as well as product/process development (complex internal and external supply chains) in order to assure that the means for collaborative service generation and product-service and production process design developed in the project are relevant for industry.

Business Case scenarios are at:

- **Volkswagen** with personalised support to drivers to optimise energy use (in classical, hybrid and electrical cars)
- **Electrolux** with services to support consumer behaviour analysis and preventive maintenance of household appliances
- **Desma** with support remote condition based maintenance for shoe manufacturing machines
- **ONA and Alberdi** with lean–based design of eco–driven services around machines

The ProSEco project has adopted a generic approach for **building Meta Products** and their associated production processes, where the product/process design takes place through collaboration within the product ecosystem, involving multiple companies and actors and applying the Cloud Manufacturing (CMfg) concept.

Meta Products can now be built as a combination of so-called **generic core services generic core services** (applicable in various sectors) and **application specific services**, while new **engineering tools** from the project support product/process design and generation of these PES services involving **collaboration of all stakeholders**.