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ΕΣΠΑ 2021-2027 Βιώσιμη Ανάπτυξη για Όλους Partnership Agreement 2021-2027

Operational Program "Central Macedonia" 2021-2017

Action: "Investment Plans of Innovation"

Project title:

"Improving competitiveness through the application of innovative digital technologies with the aim of product manufacturing optimisation, materials and energy reduction-Smart Factory"

Brief summary:

The Centre for Research and Technology Hellas (CERTH) participated in the operational program Central Macedonia 2021-2017 through the Action: "Investment Plans of Innovation" that is co funded from the European Union and National Greek funds.

Project Smart Factory aims at the use of intelligent and innovative digital technologies in the production process of the PYRAMIS Metallurgy S.A. factory, located in the Region of Central Macedonia. The proposed actions will produce direct solutions that can be directly implemented by the company aiming to improve its competitiveness by optimizing final production cost of products, resource and energy saving, improvement of production quality, and the development of new products. The projects focuses on, focus on four (4) distinct but mutually interconnected actions. These include:

1. Mapping of factory layout and manufacturing processes
2. Development of digital twin for the production using process modelling software
3. Development of digital twin for the deep drawing manufacturing process and application of "Six Sigma" methodology with the aim of:
    - quality improvement,
    - reducing the number of rejected products,
    - reducing production costs by better utilizing raw materials and machinery.
4. The development of the aforementioned digital twins will also allow for the drafting of a comprehensive study for the integration of a new manufacturing method into the production. The use of "Annealing" technology in product manufacturing will give PYRAMIS Metallurgy S.A. a competitive advantage by

developing new products in its range, which it currently mostly imports and trades.

Expected benefits of the project:

1. **Improved Production Time:** The digital management of the production process is expected to have a targeted improvement in the time it takes for materials to enter and exit the production line. An anticipated 5% improvement in production times translates to a productivity increase of 30,000 pieces or an equivalent annual production value of 500,000 euros.
2. **Reduced Waste and Increased Productivity through the application of Deep Drawing:** This investment is expected to lead to a reduction in rejected products (that require the deep drawing process during their production) and an increase in productivity for these products that constitute 85% of the factory's output.
3. **Enhanced Pricing Flexibility and Commercial Policy:** A greater ability to implement more flexible and resilient pricing and commercial policies is expected. This is a direct result of reduced energy costs and increased productivity on the production lines, leading to lower overall production costs and, consequently, a lower final selling price for products or an increased profit margin.

The aim of the project, is to increase the competitiveness of the company, enabling it to successfully meet the new challenges emerging at a business and technological level in the global and European market. This includes addressing the final production cost, saving resources and energy for environmental protection, and introducing new intelligent technologies into modern production processes.

Initially, the project will involve mapping of the production and manufacturing processes with the primary goal of identifying problems in production operations and their respective optimisation. The creation of a digital twin for PYRAMIS's production aims not only to optimize its performance but also to reduce the risk and cost of daily decision making and future investments. The development of the production's digital model will bring PYRAMIS into a new era where it will use innovative digital technologies for decision-making.

Furthermore, the project includes the optimization of the deep drawing manufacturing process through the application of a “Six Sigma" methodology for solving industrial problems, as well as the development of a digital twin for the respective process. A key factor of the project's impact is that a significant portion of the factory's total output is produced via Deep Drawing. By creating modern production flow diagrams, digitally mapping and simulating processes using innovative software, and investigating the technical factors affecting the Deep Drawing process, the study aims to resolve the critical issue of a high number of rejected products. Additionally, the use of the "6 Sigma" methodology will provide the company with know-how that can be applied to other parts of production for their optimization.

Through this study, the project aims to arrive at implementable technological solutions that will lead to the modernization of the production process, increased flexibility and efficiency in business decision-making, reduced production costs, significant savings in energy and material resources, and the development of new innovative products by the company, transforming the unit into a true Smart Factory in the Region of Central Macedonia.

The objective increase in the competitiveness of the PYRAMIS factory aims to strengthen industrial activity in the Region of Central Macedonia, maintain and increase employment in the sector, and enhance the region's technological footprint at a national and European level. Subsequently, the use of new innovative digital technologies by PYRAMIS will improve the company's capabilities and know-how, thereby providing a competitive advantage in both the Greek and international markets.

Total project budget: 400.000,00€

CERTH budget: 190.000,00€