Challenge #10

Solutions for automating sugar beet transplant processes

CONTEXT AND PROBLEM

Firm 10* represents **seed companies** in Italy. For this project, it gathered the need of different firms (*list of companies' names to be disclosed after registration*) and it is looking for a solution to **automate the field production process of sugar beet stecklings** (i.e., sugar-beet in the form of young plants). This is a strategic activity, as nearly 70% of its global demand is covered by suppliers located mainly in the Italian region of Emilia Romagna. Currently, the field **production process** of sugar beet stecklings consists of **three phases**: 1) **nursery**: the sugar-beet stecklings are harvested from the soil; 2) **calibration**: leaves/grass/dust are removed, the sugar-beet stecklings are sorted by size and placed into boxes, eventually stored/transported for transplant; and 3) **transplanting**: sugar-beet stecklings are (semi)manually planted in the soil by an operator, usually positioned on a planting machine. While the first two phases are partially automated, the third phase (transplanting) still requires extensive manual labor. Firm 10* is therefore scouting for a solution that can enable automated **handling of the sugar-beet stecklings** (correct position, direction, …) and transplanting. The solution can be a **machine** or, ideally, an **add-on component** (to be integrated into existing machinery). Additionally, Firm 10* is also open to solutions to improve the automation of the first two phases (nursery and calibration).

OBJECTIVES

- Scouting for solutions to automate sugar beet farming processes consisting in nursery, calibration and transplanting of stecklings (i.e., sugar-beet in the form of young plants). The solution can be a new machine or, ideally, an add-on, i.e. a component to be integrated into the machines already in use by farmers.
- Looking for solutions with TRL 4 (Technology validated in relevant environment) and above.
- Firm 10* is interested in co-developing a PoC or launching pilot projects together with the Solver.
- The resolution of this challenge contributes to the achievement of SDG 8 (Decent Work and Economic Growth) and 9 (Industry, Innovation and Infrastructure).

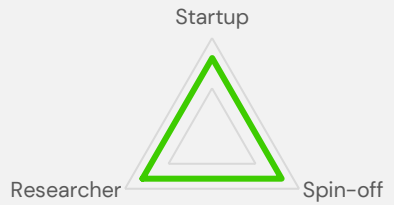
THE CHALLENGE

Solutions for automating sugar beet transplant processes

THEMATIC CLUSTER

Manufacturing Methods & Industrial Optimization

SOLVER AND KEY SDGs



KEY WORDS

#SugarBeetSeed #Planting #Automation #Transplanting #Technology

ecosister **Company name anonymized - will be revealed after registration to the program*

Trasferimento Tecnologico

Challenge #11

Sustainable solutions for disposable medical devices in advanced wound care treatment

CONTEXT AND PROBLEM

Firm 11* offers medical equipment for a wide range of applications.
The company is looking for innovative solutions for wound care, specifically materials for advanced medications, for treating skin lesions (such as ulcers and diabetic wounds). Firm 11* is seeking new **materials or technologies** for **disposable** (i.e., single-use) **medical devices** that meet one or more key requirement. These include: 1) **functional properties**, such as antibacterial or other capabilities; 2) **easy of use**, ensuring for instance secure adhesion without causing irritation to the patient **or discomfort**. Moreover, materials/technologies could ideally be: **sustainable**, either in terms of materials used (e.g., recycled materials) or by reducing environmental impact through higher durability and performance, which would require less frequent replacement or by reducing the production process impact. Additionally, they must be designed to comply with **medical device regulations**

OBJECTIVES

- Scouting for innovative materials (preferably sustainable) or technologies to optimize performance of disposable medical devices to be used in advanced wound care treatment. The ideal solution would meet (at least one) of the following requirement: have functional properties (e.g., be antibacterial) and ensure comfort/ease of use.
- Looking for solutions with a TRL 4 (Technology validated in lab) and above.
- Firm 11* is open to different types of collaboration.
- The resolution of this challenge contributes to the achievement of SDG 3 (Good Health and Well-being) and 9 (Industry, Innovation and Infrastructure).

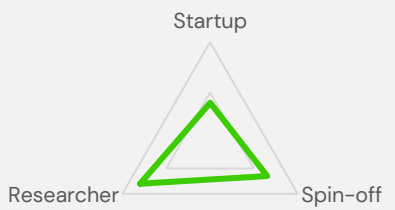
THE CHALLENGE

Sustainable solutions for disposable medical devices in advanced wound care treatment

THEMATIC CLUSTER

Manufacturing Methods & Industrial Optimization

SOLVER AND KEY SDGs



KEY WORDS

#WoundCare #Innovative #Sustainable #Disposable #Single-use #Treatment #Device

ecosister **Company name anonymized - will be revealed after registration to the program*

Trasferimento Tecnologico

Challenge #12

Solutions to merge steel and titanium for automotive exhaust pipes production

CONTEXT AND PROBLEM

Firm 12* is specialized in the manufacturing of exhaust pipes, tanks, and other components for automobiles, motorcycles, boats and aircraft.
The company is looking for a solution to **fuse steel and titanium together**. The goal is to develop a **combined material** to produce **exhaust pipes** to be used in the **automotive sector** (specifically for **supercars** manufacturing). Firm 12* wants to use **steel** for its **strength** and **ductility**, properties that allow the creation of complex tube geometries that enhance the vehicle's structural design. **Titanium** has been selected for its **lightness**, which helps reduce the overall weight of vehicles and improve consumption efficiency. The company has previously tried to combine steel and titanium through **mechanical coupling**: however, this approach requires the addition of components such as joints, which increases vehicles' weight. Firm 12* has also experimented **autoclave brazing**, but this process is highly energy-intensive and lacks sustainability from both an environmental and economic perspective. The company is therefore scouting for an innovative solution that would allow to merge **steel** and **titanium** (e.g., through laser welding), in order to create a **high-performance material** that has the key **advantages of both metals**: durability, ductility, resistance to both mechanical stress and high temperatures, as well as lightness.

OBJECTIVES

- Scouting for solutions to merge steel and titanium, to obtain an alloy to produce exhaust pipes for the automotive sector. The company wants to create a high performing material that combines the key properties of both metals: i.e. strength and ductility (steel) and lightness (titanium).
- Looking for solutions with a TRL 3 (Experimental proof of concept) and above.
- Firm 12* is interested in co-developing a PoC and/or, potentially, purchase a PlugnPlay solution.
- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and 12 (Responsible Consumption and Production).

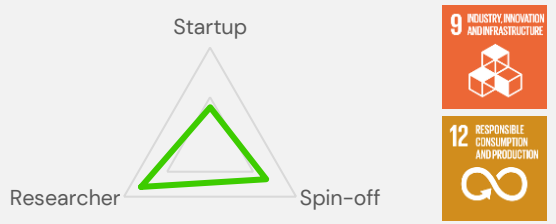
THE CHALLENGE

Solutions for merge steel and titanium for automotive exhaust pipe production

THEMATIC CLUSTER

Manufacturing Methods & Industrial Optimization

SOLVER AND KEY SDGs



KEY WORDS

#Steel #Titanium #Merge #Alloy #Automotive #ExhaustPipe

**Company name anonymized - will be revealed after registration to the program*

Challenge #13

Innovative methods or technologies for surface treatments of medical filters

CONTEXT AND PROBLEM

Firm 13* is a global technology leader in the development and manufacture of filtration solutions, primarily serving the Healthcare & Life Sciences, Energy & Mobility, Health & Safety industries. The company manufactures **filters for biomedical applications** and is seeking a solution to enhance the quality of these products. Currently, Firm 13* produces two types of filters: **microporous polymeric membranes** and **non-woven polyester filters**. These filters are processed with specific **surface treatments** to ensure proper performances (e.g., **hydro-philicity/phobicity**, **oleo-philicity/phobicity**). The company is looking for a Solver able to offer **innovative surface treatment methods** or **technologies** that can: 1) improve **filter performances** (e.g., preventing the release of hazardous substances); 2) be **sustainable** (i.e., be **PFAS-free**); and 3) make the **production process** more efficient. The ideal solution is a chemical one, but the company is open to evaluate physical/mechanical ones.
Firm 13* seeks a partner with whom they can **co-create a solution** to ensure that the application precisely addresses their **specific need**.

OBJECTIVES

- Scouting for innovative surface treatment methods or techniques for medical filters. The ideal solution should improve filters' performance, sustainability (e.g., be PFAS-free) and/or allow the company to enhance the efficiency of the filters' production process.
- Looking for solutions with TRL 5 (Technology validated in relevant environment).
- Firm 13* is interested in co-developing a PoC or launching pilot projects together with the Solver.
- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and 12 (Responsible Consumption and Production).

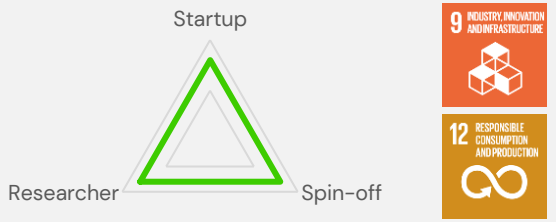
THE CHALLENGE

Innovative methods or technologies for surface treatments of medical filters

THEMATIC CLUSTER

Manufacturing Methods & Industrial Optimization

SOLVER AND KEY SDGs



KEY WORDS

#MedicalFilters #SurfaceTreatment #PFAS-free #Coating #Technology

**Company name anonymized - will be revealed after registration to the program*

Challenge #14

Sustainable sound-absorbing materials for noise reduction in industrial machinery

CONTEXT AND PROBLEM

Firm 14* is a global leader in technologies for the processing of a diverse range of materials, including wood, plastic, glass, stone, metal and composites. The company is looking for **innovative materials to improve** the **ergonomics** and sustainability of its **industrial machines**, with a particular focus on **reducing noise emissions**. In fact, currently the **noise levels** generated by the **machinery** utilized for production are **high**, **negatively affecting** the comfort of **operators** in the workplace. To address this issue, the company is scouting for a **sound-absorbing material** to be integrated into its machines, capable of **maximizing acoustic** absorption, while maintaining a **compact and optimized design**. The material must be in **solid form** and strategically positioned **inside** the machines to intercept sound waves before they propagate outside. The ideal solution should ensure **high acoustic efficiency**, be **sustainable**, and **comply with fire safety regulations**. The company's ultimate goal is to improve the working conditions of its operators, by minimizing the acoustic impact generated by its industrial machines and contributing to a more comfortable and safer industrial environment.

OBJECTIVES

- Scouting for innovative sound-absorbing materials to be inserted into industrial machinery. The ideal solution should be sustainable, ensure a compact and optimized design, as well as comply with fire safety regulations.
- Looking for solutions with a TRL 7 (System prototype demonstration in a space environment) and above.
- Firm 14* is interested in co-developing a PoC and, potentially, evaluating long-term partnerships/collaborations with the Solver (e.g., launching a pilot project).
- The resolution of this challenge contributes to the achievement of SDG 8 (Decent Work and Economic Growth) and 9 (Industry, Innovation and Infrastructure).

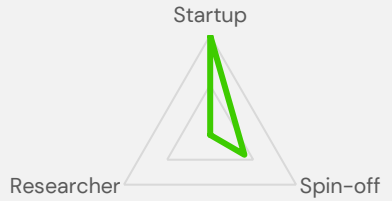
THE CHALLENGE

Sustainable sound-absorbing materials for noise reduction in industrial machinery

THEMATIC CLUSTER

Manufacturing Methods & Industrial Optimization

SOLVER AND KEY SDGs



KEY WORDS

#Sound-AbsorbingMaterial
#NoiseReduction
#IndustrialMachinery

ecosister **Company name anonymized - will be revealed after registration to the program*

Trasferimento Tecnologico

Challenge #15

Innovative durable and hard materials for steel cutting

CONTEXT AND PROBLEM

Firm 15* is a leading company in the production of industrial and technical brushes. It designs and sells customized solutions for applications across various sectors, including (e.g., automotive, precision engineering, food and packaging, …).
For the realization of these brushes, the company utilizes trimming machines equipped with blades (made of steel) that cut steel into filaments that form brushes. **Due to the repeated cutting of steel,** the blades wear out quickly, requiring frequent replacement. Firm 15* is therefore seeking an innovative, high performing and **durable material for manufacturing cutting blades**. The company is open to any material, provided that it exhibits a high level of **hardness**. In particular, if the proposed material is steel, it must have a minimum Rockwell hardness of 64 HRC for high-speed steels (HSS) and at least 69 HRC for harder steels.
The company's ultimate goal is to **optimize the brush production process** by reducing machine downtime, minimizing the frequency and time spent replacing machinery components.

OBJECTIVES

- Scouting for innovative, high performing and durable materials for the production of steel cutting blades. The ideal material must have sufficient hardness to minimize blade wear over time.
- Looking for solutions with a TRL 3 (Experimental proof of concept) and above.
- Firm 15* is interested in co-developing a PoC or launching pilot projects together with the Solver.
- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and 12 (Responsible Consumption and Production).

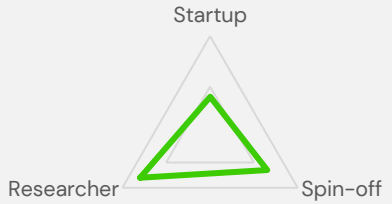
THE CHALLENGE

Innovative durable and hard materials for steel cutting

THEMATIC CLUSTER

Manufacturing Methods & Industrial Optimization

SOLVER AND KEY SDGs



KEY WORDS

#Steel #Cutting #Innovative #Material #Hardness #Durable

ecosister **Company name anonymized - will be revealed after registration to the program*

Trasferimento Tecnologico