Challenge #1
Data and information to train a process optimization software

CONTEXT AND PROBLEM

Firm 1* is a company specializing in consulting, solutions, and services to support companies in their innovation and digital transformation processes. The company is currently engaged **in developing a framework** and **a neural network** for predictive applications for process optimization. In particular, Firm 1* is designing an **advanced inventory management software** for the **pharmaceutical** sector in collaboration with a hospital in Lombardy, Italy. This solution leverages both **internal and external data** to optimize the restocking process.

Firm 1* aims to **expand the application** of this software to **additional industries**, primarily manufacturing and automotive. However, adapting the solution requires the **integration of new software components** and industry-specific data (to customize the software to industry-specific needs and usages).

To this end, Firm 1* is seeking a solver with **in-depth expertise in digital** and **production processes** within specific **industrial sectors** (i.e., automotive and machine tools). The ideal partner should be capable of **supplying relevant data** and technical expertise to **co-develop an advanced intelligent inventory management system**, enhancing efficiency and optimizing production processes.

OBJECTIVES

- Scouting for Solver with expertise in digital and production processes, offering data and technical skills to co-develop an advanced inventory management system in industrial sectors (i.e., automotive and machine tools).

- Looking for solutions with a TRL 6 (Technology demonstrated in a relevant industrial environment).

- Firm 1* 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).
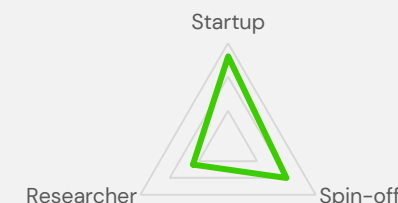
THE CHALLENGE

Data and information to train a process optimization software

THEMATIC CLUSTER

Data Collection, Analytics & Traceability for the Ecological Transition

SOLVER AND KEY SDGs

Startup

Researcher — Spin-off

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

KEY WORDS

**#DigitalTransformation
#PredictiveAnalytics
#ProcessOptimization**

Trasferimento Tecnologico

Challenge #2

Real–time and predictive crop analysis systems

CONTEXT AND PROBLEM

Firm 2* is a medium-sized company, active in carpentry and in the production of machinery for **sustainable agriculture**. European regulations require the **reduction** of chemical herbicides use, in favor of **mechanical weeding**. Through a supplier, Firm 2* currently installed a **camera system** on its weeding machines to **detect weeds among crops** and activate **automatic hoes** for precise removal. Firm 2* is looking for a **solver** that will allow them **to integrate/substitute** its **cameras** creating a system that is capable of **capturing real–time images** of crops, analysing them **instantly** to generate **comprehensive scans** —including plant type, position, and health status— and providing machinery with **precise inputs** on whether to **harvest them**. Additionally, these images should assess **other critical variables** related to plants and soil, offering operators **valuable insights** such as the presence of pathogens and overall crop health. This analysis should be conducted **through software** powered by **emerging technologies** (e.g. AI and machine learning), delivering **both historical and real–time data**, as well as **predictive projections** and shall be **adaptable to various weather conditions**, seasons, and soil types.

OBJECTIVES

- Scouting for a solution to develop a real-time and predictive crop analysis system using machine learning and computer vision.

- Looking for solutions with a TRL 3 (Experimental proof of concept).

- Firm 2* is interested in co-developing a PoC or to launch pilot projects together with the Solver.

- The resolution of this challenge contributes to the achievement of SDG 2 (Zero Hunger), 12 (Responsible Consumption and Production) and 13 (Climate action).
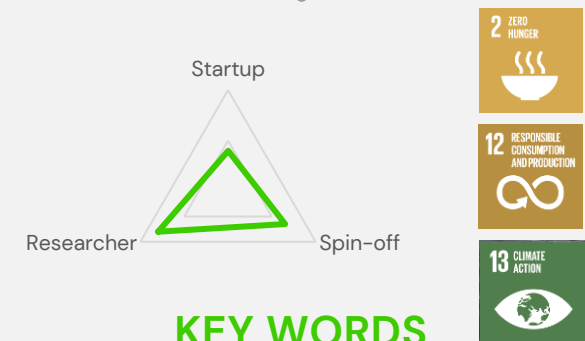

THE CHALLENGE

Real–time and predictive crop analysis systems

THEMATIC CLUSTER

Data Collection, Analytics & Traceability for the Ecological Transition

SOLVER AND KEY SDGs

Startup

Researcher — Spin-off

2 ZERO HUNGER

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

KEY WORDS

*#AgriculturalInnovation
#MachineLearning
#SustainableFarming*

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Trasferimento Tecnologico

Challenge #3
Solutions for embedding AI algorithms in vehicles for anomaly detection

CONTEXT AND PROBLEM

Firm 3* is one of the most important companies specializing in the engineering of racing cars and high-performance road cars. It is also active in the Motorsport, Aerospace and Defense sector. It is developing an **anomaly detection system** for its vehicles, designed to **predict** and report potential **failures before they occur**. To achieve this, it has already created **AI algorithms in Python**, but currently faces **difficulties embedding them** directly **into the vehicle's ECU (Electronic Control Unit)**. Firm 3* is therefore looking for a solver who can help seamlessly integrate these AI algorithms into the vehicle's onboard systems. The final goal of this anomaly detection system is to **collect** different vehicle **signals**, **interpret** them and **communicate** potential anomalies in advance.

Possible solutions may be: 1) a **system to embed** the AI **algorithms** already developed by the company into the vehicle's ECU; 2) a **software development framework** that provides **guidelines** on how to improve Firm 3*s AI **algorithms** so they are **natively compatible with ECUs**. Such system would extend the lifespan of vehicle components, thereby **improving production sustainability**. Additionally, in motorsports races, it would enhance **driver safety** by preventing failures. Finally, the solution is primarily intended for the **motorsport** industry, but applications in **luxury automotive** and **aerospace** sectors will also be considered.

OBJECTIVES

- Scouting for solutions that would allow the company to embed AI algorithms (written in Python) into the vehicle's ECU (Electronic Control Unit), enabling the implementation of an anomaly detection system that predicts and reports potential vehicle failures before they occur

- Looking for solutions with a TRL 3 (Experimental proof of concept) and above.

- Firm 3* 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 12 (Responsible Consumption and Production).
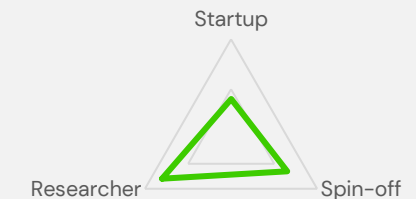
THE CHALLENGE

Solutions for embedding AI algorithms in vehicles for anomaly detection

THEMATIC CLUSTER

Data Collection, Analytics & Traceability for the Ecological Transition

SOLVER AND KEY SDGs

Startup

Researcher — Spin-off

8 DECENT WORK AND ECONOMIC GROWTH

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

KEY WORDS

#EmbeddedSystems #AnomalyDetection #AI #Algorithms #Motorsport

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Trasferimento Tecnologico

Challenge #4

Methodologies or tools to measure the carbon footprint of buildings

CONTEXT AND PROBLEM

Firm 4* is a **construction company** which has been active in the real estate sector for over 70 years. Currently, the company **gathers information** about **environmental compliance** and **impact** of construction materials/processes **in a fragmented way** (e.g., Excel spreadsheets and emails). This fragmentation makes it difficult to set up a system to analyse and measure the carbon footprint of the entire life cycle of a building. Thus, Firm 4* is looking for a methodology or a **solution to collect, process and report environmental** impact **data** about materials and techniques used to construct as well as demolish a building. The solution/methodology shall allow the simulation of **measurement** of the overall lowest-possible **carbon footprint** by combining first and than tracking in field/on site data about the impact of **raw materials** (as input) used and of the construction method/process (as system/service) for individual properties/construction sites, with the goal of **quantifying emissions** (a value or a range of values) as estimated and then verified. By doing so, the system must allow the identification of the **most polluting elements** (e.g., material/construction phase) and provide useful **outputs/analytics** for managerial and strategic **decisions**, both at aggregate level (all properties/construction sites) and for each property/construction site. The ideal solver shall be familiar with **environmental certifications** (e.g., EAM, LEED,...) and **analysis tools** (e.g., LCA,...). The solution can be the intersection of a Supply Chain Collaboration platform and a BIM software, but the company is open to other tools or data gathering and evaluation methods.

OBJECTIVES

- Scouting for methodologies and tools to integrate and analyze carbon footprint of buildings in all its lifecycle, measuring the emissions for strategic decisions.

- Looking for solutions with a TRL 4 (Laboratory validated technology) and above.

- Firm 4* 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), 11 (Sustainable Cities and Communities) and 13 (Climate Action).
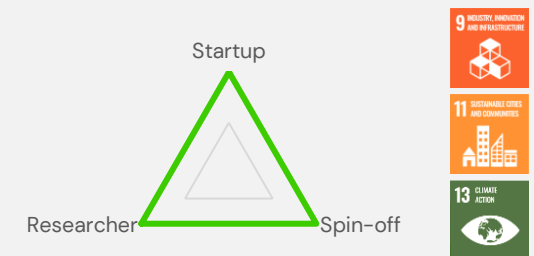

THE CHALLENGE

Methodologies or tools to measure the carbon footprint of buildings

THEMATIC CLUSTER

Data Collection, Analytics & Traceability for the Ecological Transition

SOLVER AND KEY SDGs

Startup

Researcher — Spin-off

KEY WORDS

#SustainableConstruction #EnvironmentalImpact #BuildingInnovation

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Trasferimento Tecnologico

Challenge #5
Solution for underground infrastructure mapping and analysis

CONTEXT AND PROBLEM

Firm 5* is a multi-utility company that operates in the fields of electricity, gas, heating, water management, environmental services, and energy efficiency solutions.
The company is looking for a **solution to map underground proprietary infrastructures** (such as gas, electricity, water networks pipes, …) in urban construction sites under maintenance. The goal is to obtain accurate and up-to-date cartographic survey thanks to **3D digital mapping** of the "as-built" state of underground infrastructures. This information will be utilized to **optimize maintenance** activities, improve the **planning and execution** of new projects and analyze overall infrastructures details. Firm 5* is therefore looking for a solution that can: 1) **identify** underground infrastructure elements (e.g., pipes) through captured images (e.g., through vision or other technologies); 2) **categorize** these elements and **analyze key information** (e.g. depth, …); 3) **assign** to each element **geographic coordinates**, enabling the creation of an underground infrastructure map; 4) **gather data** in a central system (based on Firm 5*'s **GIS system**) to provide analytics and **actionable insights** for management. Firm 5* is therefore looking for a **hardware** and **software** (to be **integrated** into **GIS**) solution that supports operators in detecting images.

OBJECTIVES

- Scouting for a solution (software and/or hardware) capable of mapping underground infrastructure, identifying, classifying and georeferencing it and its main info, and transmitting the collected data to the company's central IT system for further processing. The goal is to generate actionable insights to improve the efficiency of construction site operations.

- Looking for solutions with a TRL 6 (Technology demonstrated in a relevant industrial environment).

- Firm 5* is open to different types of collaboration.

- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and 11 (Sustainable Cities and Communities).
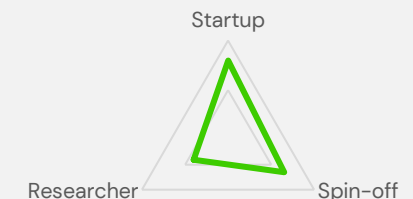
THE CHALLENGE

Solution for underground infrastructure mapping and analysis

THEMATIC CLUSTER

Data Collection, Analytics & Traceability for the Ecological Transition

SOLVER AND KEY SDGs

Startup

Researcher — Spin-off

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

11 SUSTAINABLE CITIES AND COMMUNITIES

KEY WORDS

#UndergroundInfrastructure #Mapping #Infrastructure #Digitalization #GeospatialDataAnalysis

Trasferimento Tecnologico

Challenge #6
Methodologies and analyses to launch Digital Product Passport

CONTEXT AND PROBLEM

Firm 6*, a global leader in complete solutions for the processing, packaging and distribution of food products, is interested in deepening its know–how regarding **the Digital Product Passport** (DPP). This is a digital system that collects and provides detailed information on a product throughout its life cycle and is required by the **European Green Deal**. The company aims to assess if it has all the **necessary tools and capabilities** to integrate the DPP along the **entire supply chain**, from production to disposal, leveraging it as a **strategic opportunity**.

In this context, the company seeks to identify the key data to make the DPP **effective and scalable**, ensuring **interoperability between partners** and enhancing the **value of the supply chain.**

Therefore, Firm 6*is looking for a Solver with expertise in the **analysis of complex technical infrastructures** and **data models**, capable of proposing a **structured assessment and methodology** for the future implementation of the DPP along the value chain. This study should enable to **develop a framework** that would allow the company to foster a corporate culture ready for the implementation of the DPP, improving transparency and sustainability of its value chain.

OBJECTIVES

- Scouting of methodologies for managing and analyzing the technical infrastructure, data model and the capabilities to make the Digital Product Passport an effective and scalable tool.

- Looking for solutions with a TRL 6 (Technology demonstrated in relevant environment) and above.

- Firm 6* is interested in obtaining an assessment to launch a pilot in the future.

- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and 12 (Responsible Consumption and Production).
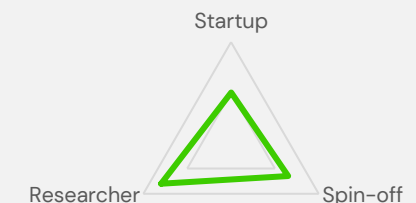

THE CHALLENGE

Methodologies and analyses to launch Digital Product Passport

THEMATIC CLUSTER

Data Collection, Analytics & Traceability for the Ecological Transition

SOLVER AND KEY SDGs

Startup

Researcher — Spin-off

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

KEY WORDS

#DigitalProductPassport #Sustainability #SupplyChain #Innovation

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Trasferimento Tecnologico

Challenge #7

Methodologies or technologies to measure the carbon footprint of palm oil production

CONTEXT AND PROBLEM

Firm 7* offers high-end raw materials, goods for resale and finished products in the agri-food sector, for industries, artisans, Ho.Re.Ca. and retail. As part of its decarbonization strategy, the company aims to **measure the carbon footprint** of its products, being it a key parameter for both the business and its stakeholders. Firm 7* seeks a solution to estimate the **carbon footprint of palm oil**, which is used by the company as raw material for refining or as ingredient for other products and can be bought from different suppliers (extra UE traders or producers) in different geographical areas. The goal is to support **procurement** in selecting palm oil suppliers with the highest carbon footprint performance, therefore contributing to the company's sustainability standards. In fact, the palm oil-related carbon footprint is primarily generated by suppliers (first and foremost linked to the cultivation phase). The ideal solution may either be: 1) a **methodology** that allows to estimate CO_2 emissions generated by specific suppliers or geographical areas; or 2) a **technology** that enables the measurement of a supplier' carbon footprint (e.g., a **satellite-based** CO_2 emission tracking system). The output should be an **assessment of CO_2 emissions** (either a precise measurement, an approximation or a range of metrics) that can be used to classify suppliers, determining whether they meet the company's sustainability target. Also, this data will be used to calculate the overall **carbon footprint** of the final product. The solution must comply with **data privacy regulations and is preferable tailor-made**.

OBJECTIVES

- Scouting for methodologies or technologies to measure the carbon footprint of palm oil production (specifically the carbon footprint generated by palm oil suppliers). The solution must provide a reliable value that the company can use as a reference when making procurement decisions (i.e., selecting or engaging suppliers during the contract period).

- Looking for solutions with a TRL 3 (Experimental proof of concept) and above.

- Firm 7* is open to co-developing a PoC or to analyse a ready-to-market solution.

- The resolution of this challenge contributes to the achievement of SDG 12 (Responsible Consumption and Production), 13 (Climate Action) and 15 (Life on Land).
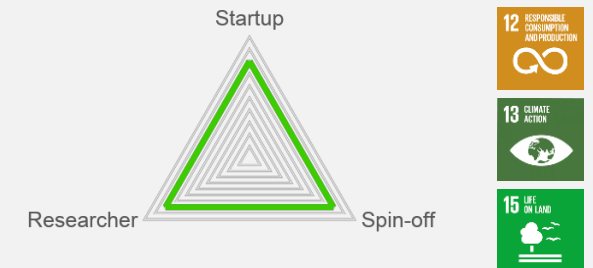
THE CHALLENGE

Methodologies or technologies to measure the carbon footprint of palm oil production

THEMATIC CLUSTER

Data Collection, Analytics & Traceability for the Ecological Transition

SOLVER AND KEY SDGs

Startup / Spin-off / Researcher

12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
15 LIFE ON LAND

KEY WORDS

#CarbonFootprint #PalmOil #Suppliers #Procurement #Decarbonization

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Trasferimento Tecnologico

Challenge #8

Technologies and tools for ensuring traceability in automotive parts sourcing

CONTEXT AND PROBLEM

Firm 8* is an Italian financial company active in the insurance, banking, real estate and hospitality sectors. One of the branches of the group, Firm 8* Service, is specialized in providing high-quality car repair services. In case of **road accidents**, this unit sources **replacement parts for clients' damaged vehicles** through a network of suppliers and then direct customers to authorized mechanical workshops for installation. Firm 8* Service is looking for a solution to reduce the environmental impact of this process, by promoting the reuse of spare parts, including those from scrapyards. To achieve this, the company aims to implement a **system that traces the origin** of every spare part, specifying both the source **vehicle** and the **supplier**. This would increase transparency, prevent illegal practices (such as using parts from stolen vehicles), and ensure customers are informed about the quality and ethical sourcing of the parts.

The ideal solution would be a **tool/technology** (e.g., digital passports, blockchain, …) that allows the **identification**, **tracking** and storage of **data** about the replacement parts within a company database, which should be compatible with **SAP**. Additionally, the solution should elaborate the information and present it in a way that enables operators to gain aggregated valuable insights.

The goal is to ensure the reliability of suppliers and enhance the circularity of the supply chain.

OBJECTIVES

- Scouting for technologies and tools that enable tracing the origin of car components used in repairs after car accidents. The ideal solution would allow to identify both the supplier and the original vehicle, then transmit this data to the company's IT system (SAP) for further analysis.

- Looking for solutions with a TRL 6 (Technology demonstrated in a relevant industrial environment).

- Firm 8* 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), 11 (Sustainable Cities and Communities) and 12 (Responsible Consumption and Production).

THE CHALLENGE

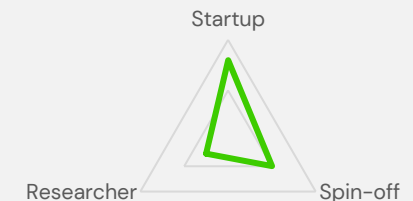*Technologies and tools for ensuring traceability in automotive parts sourcing*

THEMATIC CLUSTER

Data Collection, Analytics & Traceability for the Ecological Transition

SOLVER AND KEY SDGs

Startup
Researcher — Spin-off

SDG 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
SDG 11 SUSTAINABLE CITIES AND COMMUNITIES
SDG 12 RESPONSIBLE CONSUMPTION AND PRODUCTION

KEY WORDS

#SpareParts #Sourcing #Traceability #Tracking #Automotive

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Trasferimento Tecnologico

Challenge #9

Software for data analysis and harmonization suitable for SMEs

CONTEXT AND PROBLEM

Firm 9* is a company serving the baking industry by offering pre-cooked and frozen bakery products, as well as raw semi-finished frozen dough.

The company is preparing its first **sustainability report** and is looking for a solution that would allow it to collect the necessary **information** to include in it, such as its carbon footprint. Firm 9* already has data on its environmental impact related to its production process and supply chain. For example, it knows which activities and machinery consume the most energy, e.g., the **thermal shock freezer** that operates at –30°C. However, this data is scattered across multiple sources and is not yet elaborated together, which makes it difficult for the company to have a clear, unified view of its sustainability performance. Firm 9* is therefore seeking a software that can **analyze and harmonize** these data deriving from different sources. The ideal solution should be **compatible with the existing production management system** in place **(ORIPAN)**, to enable a more efficient and optimized **production**, by providing analytics and custom dashboards to guide managerial decision-making. Specifically, the company wants to identify the most energy-consuming activities and adjust production planning to **reduce its environmental impact**. The solution should be **cost-effective** and suitable for a **small to medium-sized enterprise (SME)** like itself.

OBJECTIVES

- Scouting for software to analyze and harmonize data related to the company's environmental impact. The ideal solution should be compatible with the ORIPAN system and affordable for SMEs.

- Looking for solutions with a TRL 6 (Technology demonstrated in a relevant industrial environment) and above.

- Firm 9* is open to different types of collaboration.

- The resolution of this challenge contributes to the achievement of SDG 12 (Responsible Consumption and Production) and 13 (Climate Action).
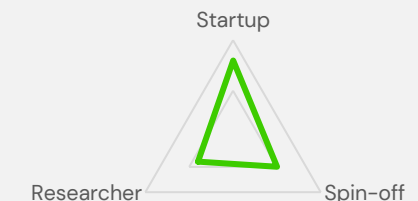
THE CHALLENGE

Software for data analysis and harmonization suitable for SMEs

THEMATIC CLUSTER

Data Collection, Analytics & Traceability for the Ecological Transition

SOLVER AND KEY SDGs

Startup

Researcher — Spin-off

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

KEY WORDS

#Software #Data #Analysis #Harmonization #CarbonFootprint #EnvironmentalImpact #SME

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Trasferimento Tecnologico