

# Missione 4

## Istruzione e Ricerca

GROWTHING RESILIENT, INCLUSIVE AND  
SUSTAINABLE  
SPOKE 1 – FIRMS



Finanziato  
dall'Unione europea  
NextGenerationEU



Ministero  
dell'Università  
e della Ricerca



**Italiadomani**  
PIANO NAZIONALE  
DI RIPRESA E RESILIENZA

# SPOKE 1 FIRMS

**WPI – To define strategies and tools to effectively engage consumers in the ecological and digital transition.**

**WPI Members:**

**Bocconi University:** Sandro Castaldo, Sara Valentini, Qiaoni Shi, Generoso Branca.

**Sant'Anna School of Advanced Studies:** Marco Frey, Iovino Roberta, Francesco Testa, Vinicio di Iorio, Micol Batelli.

**University of Bologna:** Elisa Montaguti, Anna Maria Tuan, Federica Caboni, Stefania Farace, Cristoforo Losito, Giuseppe Cappiello.



Finanziato  
dall'Unione europea  
NextGenerationEU



Ministero  
dell'Università  
e della Ricerca



Italiadomani  
PIANO NAZIONALE  
DI RIPARAZIONE E RESILIENZA



# What encourages the adoption of sustainable behaviour?



## Overview

### Unlocking Effective Consumer Behavior Change: A Deeper Look

- i. People appear responsive to 'green' stimuli, yet often fail to translate this openness into concrete actions, such as purchases or a willingness to pay.
- ii. How do sustainable behaviors evolve over time, shaped by shocks, contexts, and incentives? Are these changes lasting or merely temporary?
- iii. Green communications can indeed be ineffective and even potentially damaging to a brand. Which factors affect the effectiveness of green communication and how?



# Project A: Evaluating Consumer Readiness to Invest in Sustainable Goods

**Objective:** Quantify how much customers are willing to pay for sustainable goods

## Description:

Analyzing the impact of different sustainable claims (e.g., '100% organic', '100% recycled', from sustainable agriculture) printed on grocery packaging on consumer choice and spending, using Nielsen and GS1 datasets from Italy. We closely monitor the introduction and modifications of sustainable claims on grocery product packaging.

## Outcome prediction:

Different sustainable claims lead to heterogeneous effect among consumers.

## Data Sources:

- Immagino GS1:
  - Photos of packaging and barcode analysis for each SKU of grocery products.
  - 134,449 active SKUs in the database
  - 2,051 brands
- Nielsen Sales Data:
  - Provides data on price and sales for each SKU of grocery products.
- Nielsen Consumer Panel:
  - Monitors consumer behavior over time.



# Project B: Eco-Movement Echoes: Tracing Sustainability Shifts with GPS Data

**Objective:** Assess the impact of external events on customers' sustainable actions

## Description:

- To understand the role of external shocks like eco-movements in enhancing consumer awareness and adoption of sustainable practices, we investigate the influence of Greta Thunberg's 2019 environmental activism, including her transatlantic voyage, her Climate Action Summit speeches, and the New York City climate strike.

## Data:

- device-level mobile GPS location data
  - 9448 individuals
  - 180,303 visits
- Places of Interest (POI) information
  - transportation habits.
  - Engagement with sustainable vs. unsustainable brands.
  - Individual energy usage.

## Outcome prediction:

- Eco-movements significantly propel consumers towards adopting more sustainable behaviors, thereby contributing to a reduction in their carbon footprints.
- The treatment effect is heterogeneous among consumers who were actively involved in these events and those who were passively exposed.



Finanziato  
dall'Unione europea  
NextGenerationEU



Ministero  
dell'Università  
e della Ricerca



Italiadomani  
PIANO NAZIONALE  
DI RIPARAZIONE E RESILIENZA



Sant'Anna  
Scuola Universitaria Superiore Pisa

***RQ: How does tension management evolve over time and influence the consumer's ability to support a sustainable transition?***

## 6 surveys in three years: provider and methodological note

- **Provider** identified (comparison of three offers):
- The **reference population** is the Italian population aged between 18 and 70, resident in Italy.
- The **samples** will be drawn, by quota, from the SWG online research community.
- The **sample relating to the first administration** ( wave ) will be randomly selected, stratified by sex, age and geographical origin and will be made up of **2000 respondents** .
- The same sample will be contacted again for the **following 5 waves** in a Panel logic.
- Since the samples of the subsequent waves must maintain a homogeneous number and composition compared to the basic sample, **the Panel component that "falls" will be reinstated** (estimating an abandonment rate of approximately 20% between one wave and the next) with subjects having the same characteristics, so as to always have, for each wave, samples of 2,000 interviews, homogeneous and comparable to each other.

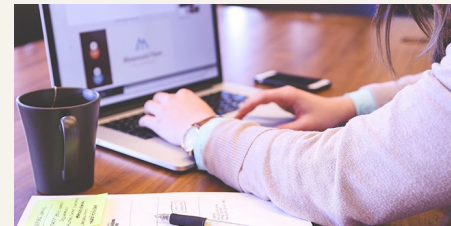






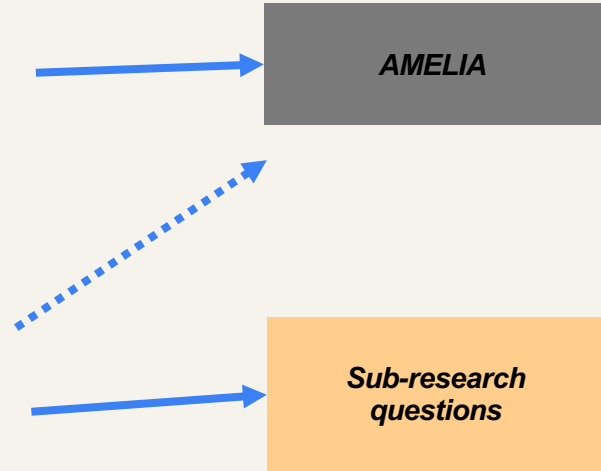
## 6 surveys in three years: provider and methodological note

- The survey will be conducted with the CAWI technique.
- The Sant'Anna school will provide, for each of the 6 waves, a questionnaire in Word (or similar) format of approximately 25-30 questions in Italian.
- The questions will mainly be closed-ended. **Some of the questions will be fixed, while some will be developed from time to time by researchers to explore specific themes .**
- **Experiments** (factorial and/or Discrete Choice) may also be included within the questionnaires .
- The first wave will be launch within the end of Feb



## The design: a preliminary idea

- Each survey will ideally be structured into 3 sections
- *Section 1* : mapping of behaviors and other psychological factors (e.g. mindset ; acceptance/recognition of tensions) and their evolution over time
- *Section 2* : specific questions from each survey which will serve to answer sub-research questions or capture specific elements that emerge during the project
- *Section 3*: Choice simulations to explore behaviors in specific choice settings where conflicting factors emerge





# Project A: Communicating Sustainability on Social Media :

## Objective:

- **Description:** Both academics and practitioners agree that advertising plays a major role in generating public awareness about environmental issues, communicating a green brand image, and driving consumer demand for green products (Segev, Fernandes and Hong, 2016; Pitman and Abel, 2022)
- We intend to invest the effectiveness of firms' sustainable messages in social media by focusing our attention on the role of multi-modal communication.

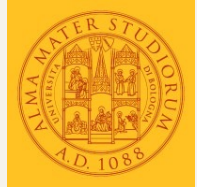
## Outcome prediction:

We will investigate the effectiveness of the different communication modes, and we will provide insights on their effectiveness and their effect size.

**Data Sources:** We have already scraped the social campaigns (Instagram and TikTok) of the Fortune 500 European companies that undertook sustainability-related campaigns, we then text-and content- analysed these via NLP. This study will lead the ground to further field and lab experiments

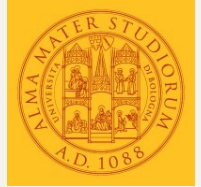
We also secured the cooperation of TikTok to gain access to some campaigns via API.

We will also conduct a series of lab experiments.





# Project B: Evaluating the role of sensitive cues onto the evaluation of sustainable product



## Description:

We are examining the role of virtual cues (i.e. haptics) on the consumers' probability to adopt sustainable products.

## Data Sources:

- We are designing a series of lab experiments aiming to document the effect of haptic cues on consumer's sustainable product evaluation
- We will conduct these experiments on a panel of consumers.



Finanziato  
dall'Unione europea  
NextGenerationEU



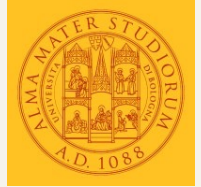
Ministero  
dell'Università  
e della Ricerca



Italiadomani  
PIANO NAZIONALE  
DI RIPARAZIONE E RESILIENZA



## Project C: How firm interventions affect the adoption of pro-social behavior? Are these changes lasting or merely temporary?



**Description:** Our goal is to uncover consumer drive to engage in pro-social initiatives: we intend to measure how participating to gamified initiatives meant to trigger pro-social behavior leads to changes in potentially damaging behavior.

### Outcome prediction:

Which firms' led initiatives lead to the adoption of prosocial behaviors. Causal relationships will be uncovered and their magnitude will be shared with Amelia

### Data Sources:

We have secured the cooperation of a leading Multi-Utility company. This firm has recently created a new platform accessible to customers where it implements several prosocial campaigns, i.e. campaigns meant to reduce energy consumption.

We are monitoring customers' behavior during these campaigns and we plan to monitor how being exposed to these interventions changes their underlying consumptions and their engagement with the platform in the short and long-time

# SPOKE 1 FIRMS

## WP2 – Improve firms' resilience to external shocks and environmental jolts

WP2 Members:

SDA Bocconi  
University of Padova  
Tor Vergata University

# Agenda

## 1. WP#2 Targets

- a. Status
- b. Deliverables

## 2. Dissemination Activities

- a. Internal events
- b. External events
- c. Publications (accepted articles)
- d. Publications (pipeline)

# WP#2 Targets status and deliverables

Deliverable	Deadline	Status	Summary
<b>1. Indicators based on data on the value chains of 500 Italian firms</b>	<b>M12</b>	<b>100%</b>	<p><b>Final Deliverables:</b> two reports with the following topics</p> <ul style="list-style-type: none"> <li>Indicators based on data on the value chains of 500 Italian firms (analyzing the resilience of Italian firms considering different practices and technologies)</li> <li>Pooling of secondary data and survey (GRI standards for SMEs and Leaders)</li> </ul>

Finanziato dall'Unione europea  
Ministero dell'Università e della Ricerca  
Italiadomani  
FONDO NAZIONALE DI RIPARAZIONE E RESILIENZA

Finanziato nell'ambito del Piano Nazionale di Ripresa e Resilienza (PNRR), Missione 4, Componente 2, Intervento 1.3: Creazione di infrastrutture universitarie, di centri di ricerca, di attività di ricerca e di innovazione per il finanziamento di progetti di ricerca di base.

**GRINS FOUNDATION**

**Collection and pooling of secondary data**

Finanziato dall'Unione europea  
Ministero dell'Università e della Ricerca  
Italiadomani  
FONDO NAZIONALE DI RIPARAZIONE E RESILIENZA

**Document data**

Title	Spoke 1 Work Package 2 021 Collection and pooling of secondary data (M12)
Owner	Bocconi University
Contributor/s	Bocconi University (main contribution) in collaboration with the University of Padua (internal first release) and Rome Tor Vergata (internal second release)
Document version	021 - v1
Last version date	30/11/2023

**Executive summary**

This report examines how Italian companies are integrating sustainability and resilience into their strategies. The focus is on various managerial practices, performance metrics, and the adoption of emergent technologies, with a particular emphasis on the application of Global Reporting Initiative (GRI) standards. Since the aim of the report is to pull for secondary data, it analyses a sample of 525 Italian companies post the first COVID-19 wave, offering a comprehensive understanding of their adaptive strategies amidst significant disruptions.

The study compares the 'Leaders' in sustainability against the small and medium firms, showing that higher resilience and commitment to sustainability exist among leading companies. Case studies of global corporations like Intel, Google, IKEA, and Nestlé enrich the report and confirm the findings from secondary data.

The findings offer invaluable insights for policymakers, business leaders, and researchers, emphasizing the importance of sustainability and resilience in contemporary business practices. Specifically, the report provides outputs of this report provide insights into the strengths and vulnerabilities of companies in facing disruptions like COVID-19. So, this report enhances the



## WP#2 Targets status and deliverables

Deliverable	Deadline	Status	Summary
<b>1. Indicators based on data on the value chains of 500 Italian firms</b>	<b>M12</b>	<b>100%</b>	<p><b>Final Deliverables:</b> two reports with the following topics</p> <ul style="list-style-type: none"> <li>• Indicators based on data on the value chains of 500 Italian firms (analyzing the resilience of Italian firms considering different practices and technologies)</li> <li>• Pooling of secondary data and survey (GRI standards for SMEs and Leaders)</li> </ul>
<b>2. Data based on minimum 1000 firm-level responses in survey among Italian firms</b>	<b>M15</b>	<b>70%</b>	<p><b>Completed tasks:</b></p> <ul style="list-style-type: none"> <li>• Conducting a thorough literature review in the fields of resilience and sustainability</li> <li>• Devising the questionnaire</li> <li>• Screening and identifying the best provider for running a survey</li> </ul> <p><b>Ongoing tasks:</b></p> <ul style="list-style-type: none"> <li>• Data collection (Finalization of the survey process )</li> <li>• Preparing the report and presenting the results</li> </ul>

## WP#2 Targets status and deliverables

Deliverable	Deadline	Status	Summary
<b>1. Indicators based on data on the value chains of 500 Italian firms</b>	<b>M12</b>	<b>100%</b>	<p><b>Final Deliverables:</b> two reports with the following topics</p> <ul style="list-style-type: none"> <li>Indicators based on data on the value chains of 500 Italian firms (analyzing the resilience of Italian firms considering different practices and technologies)</li> <li>Pooling of secondary data and survey (GRI standards for SMEs and Leaders)</li> </ul>
<b>2. Data based on minimum 1000 firm-level responses in survey among Italian firms</b>	<b>M15</b>	<b>70%</b>	<p><b>Completed tasks:</b></p> <ul style="list-style-type: none"> <li>Conducting a thorough literature review in the fields of resilience and sustainability</li> <li>Devising the questionnaire</li> <li>Screening and identifying the best provider for running a survey</li> </ul> <p><b>Ongoing tasks:</b></p> <ul style="list-style-type: none"> <li>Data collection (Finalization of the survey process)</li> <li>Preparing the report and presenting the results</li> </ul>
<b>3. Laboratories and experiments in at least 5 Italian firms</b>	<b>M24</b>	<b>10%</b>	<p><b>Ongoing tasks:</b></p> <ul style="list-style-type: none"> <li>Searching for companies to be engaged in this target.</li> </ul> <p><b>Future tasks:</b></p> <ul style="list-style-type: none"> <li>Selecting 5 companies to involve in both the labs and in the experiments</li> <li>Brainstorming to fix the boundary of the analysis: resilience vs. sustainability</li> <li>Make a pilot experiment</li> <li>Preparing reports and presentations</li> </ul>

## WP#2's milestones and targets

Milestones		Targets
1.	Pooling of secondary data and survey (M15)	1. Indicators based on data on the value chains of 500 Italian firms (M12)
2.	Release of tool for assessing vulnerability (M26)	2. Data based on minimum 1.000 firm-level responses in survey among Italian firms (M15)
3.	Release of configurator for design of company strategies to increase resilience (M36).	3. Laboratories and experiments in at least 5 Italian firms (M24).



## WP#2's Dissemination Activities – Internal Events

### 1) SDA Bocconi – *Organizing a mini-workshop to present three conceptual models and research topics out of the questionnaire:*

#### Research Topics (19-Jan-2024)

- 1) Trindade, M.A.M., The impact of Technology Adoption on Resilience and Sustainability: The Mediation Effect of Stakeholder Involvement.
- 2) Ruzza, D., Value chain disruption and resilience strategies: Integrating contingency theory and dynamic capabilities
- 3) Vishkaei, B.M., The Impact of Environmental and Social Sustainability on Resilience: The Moderating Effect of Coordination

### 2) University of Padova – *Organizing internal seminars on the following Working Papers:*

#### Research Topics (April 2024)

- 1) Gianecchini, M., Carlet, E. Inside, outside., The role of learning capabilities, micro-level dynamics, cross-boundary relationships in enhancing organizational resilience.
- 2) Passetti, E., Goffetti, G., Gianecchini, M., Carlet, E., Mapping management control, crisi and resilience: a systematic literature review and a research agenda

## WP#2's Dissemination Activities – Internal Events

**3) Tor Vergata University** – *Department of Management and Law Economics Tor Vergata internal seminars on the following Working Papers/Research proposals concerning the WP2 (provisional titles and authorships):*

### **Research Topics** *(mid of May 2024)*

- 1) Pellegrini M.M., Kargina M., Rubino N. Interdependence between technology adoption and sustainable strategies. A bibliometric and systematic literature review approach
- 2) Kargina M., Pellegrini M.M., Rubino N., What is necessary for sustainable strategy implementation? A Necessary Condition Analysis approach to the green and sustainable transition.
- 3) Rubino N., Pellegrini M.M., Kargina M. Organizational resilience and industry 4.0 innovation. Achieving Resilience through digitalization and sustainable practices
- 4) Pellegrini M.M., Rubino N., Kargina M. Configurations of organizational practices to manage and foster resilience and adaptability.



## WP#2's Dissemination Activities – External Events

### Bocconi University

- 1) “Resilience, Sustainability, and Value Chain”, Vishkaei, B.M., Trindade, M.A., Ruzza, D., De Giovanni, P., Annual Workshop on Supply Chain, Logistics and Operations, SIMA-GT
- 2) “Resilience and Circular Economy : A Game Theory Model” by Vishkaei, B.M., De Giovanni, P., to to *EURAM 2024 annual conference*
- 3) “Creating Resilient and Sustainable Business Networks Through Collaboration: Strategies and Technologies” by Vishkaei B.M., De Giovanni P., to *IMP Forum Seminar, 2024, Italy.*
- 4) Presentations in other national and international conferences in 2024:
  - INFORMS Annual Meeting, Seattle, US.
  - INTERNATIONAL SYSTEM DYNAMICS CONFERENCE Bergen, Norway
  - BAM - Virtual Conference - Sep-2024
  - 7th European Conference on Industrial Engineering and Operations Management, Germany, July 2024.
  - EURO- Denmark, July 2024.
  - POMS Turkey International Conference
  - International Conference on Optimization and Decision Science
  - SIMA – GT in Logistics, Supply Chain and Operations
  - International Symposium of Dynamic Games
- 5) Other dissemination activities: Seminars and workshops at the Sustainable Operations and Supply Chain Monitor at SDA Bocconi and Bocconi University

## WP#2's Dissemination Activities – External Events

### University of Padova

- 1) Submission of the paper "Can the arts contribute to organizational resilience? A quasi-systematic literature review"*2nd Organizing Creativity Transalpine Paper Development Workshop*, University of Modena and Reggio Emilia 27-28 May 2024 (under review)
- 2) Submission of the paper "Une folie organisée: Can the arts contribute to organizational resilience? A quasi-systematic literature review" by Enrico Carlet to *EURAM 2024 annual conference* (under review)

### Tor Vergata University

- 1) Submission of the paper "Digital technology and digital resilience in the context of Internationalization. The case of Chinese Small and Medium Companies" by M. Pellegrini to *EURAM 2024 annual conference* (under review)
- 2) Participation of Massimiliano M. Pellegrini to the symposium "Sustainable Development: The role for communities to co-create value-adding perspectives" as panelist, with a seminal paper on the role of digital technology for sustainable development.



## WP#2's Dissemination Activities – Publications

### Accepted Articles (*Bocconi University*)

- Urrea, N. T., Vishkaei, B. M., & De Giovanni, P. (2024). Operational Risk Management in E-Commerce: A Platform Perspective. *IEEE Transactions on Engineering Management*.

### Pipeline (*Bocconi University*)

- 1) Ruzza, D., Trindade, M.A., Vishkaei, B.M., Grando, A., De Giovanni P. A special forum on resilience, sustainability, and value chain. 3-4 papers in *Economia e Management*
- 2) Trindade, M.A.M., Vishkaei, B.M., De Giovanni, P., Grando, A., The impact of Technology Adoption on Resilience and Sustainability: The Mediation Effect of Stakeholder Involvement.
- 3) Ruzza, D., Trindade, M.A.M., De Giovanni, P., Grando, A., Value chain disruption and resilience strategies: Integrating contingency theory and dynamic capabilities
- 4) Vishkaei, B.M., Ruzza, D., De Giovanni, P., Grando, The Impact of Environmental and Social Sustainability on Resilience: The Moderating Effect of Coordination.

+ Three working papers every 6 months.





## WP#2's Dissemination Activities – Publications

### **Pipeline** *(University of Padova)*

- 1) Literature review on the contribution of management control to organizational resilience during crises (Special Issue of Accounting, Auditing & Accountability Journal)
- 2) Literature review on the contribution of artistic interventions to organizational resilience during crises (target journal - Management Learning)
- 3) The role of learning capabilities, micro-level dynamics, cross-boundary relationships in enhancing organizational resilience.
- 4) Management control mechanisms and resilience capabilities

### **Seminal Papers**

- 1) Resilience under scrutiny: An empirical investigation of Italian firms' resilience capabilities and responses to adversities.
- 2) A project that authentically embodies GRINS Foundation's values: cooperation, multidisciplinary, and transparency



## WP#2's Dissemination Activities – Publications

### **Pipeline** *(Tor Vergata University)*

- 1) Pellegrini M.M., Kargina M., Rubino N. Interdependence between technology adoption and sustainable strategies. A bibliometric and systematic literature review approach
- 2) Kargina M., Pellegrini M.M., Rubino N., What is necessary for sustainable strategy implementation? A Necessary Condition Analysis approach to the green and sustainable transition.
- 3) Rubino N., Pellegrini M.M., Kargina M. Organizational resilience and industry 4.0 innovation. Achieving Resilience through digitalization and sustainable practices
- 4) Pellegrini M.M., Rubino N., Kargina M. Configurations of organizational practices to manage and foster resilience and adaptability.

## SPOKE 1 FIRMS

# WP3 – To increase firms' efficiency in circular resource management along the whole value chain

WP3 Members:

SSSA: Frey, Iraldo, Niero, Rossi, Marrucci, Albano, Corsini, Fundoni

UNIBA-BA: Lagioia, Paiano, Ingrao, Crovella

UNIBA-Jonico: Notarnicola, Spizzirri, Astuto

UNICT: D'amico, Porto, Rizzo, Spina

UNITOV: Appolloni

## WP 3 – To increase firms' efficiency in circular resource management along the whole value chain

### WP objectives:

- ❑ WP 3 refers to companies' entire supply chains (including re-shoring) to assess the environmental impacts of specific sectors (e.g., agri-food) and industrial clusters.
- ❑ It will support companies to adopt efficient and circular strategies/tools and sustainable, innovative solutions, facilitate the transition to industrial symbiosis models, and measure their local impacts.

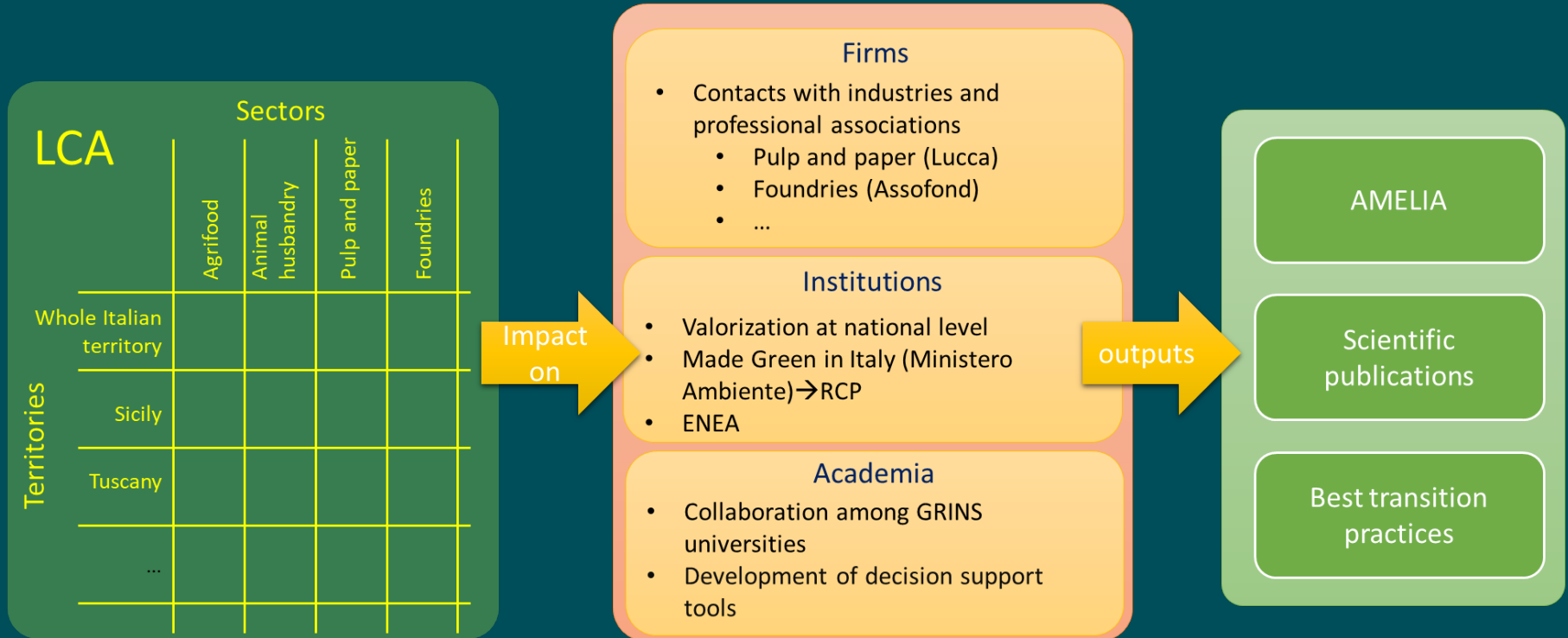
### List of activities and description:

1. Identifying: strategies/tools that can help companies and supply chains improve their replies to climate change and reorient their business models according to a low-carbon economy;
2. technical actions that can assist companies in moving to circular economy paths even through the identification of industrial symbiosis processes.
3. identifying best practices and developing multidisciplinary empirical analyses on relevant business and ecosystems issues in the circular economy will support the construction of simulation models for long-term impact assessments.

### List of deliverables:

- D.3.1 LCI (Life Cycle Inventory) national and regional datasets for the main Italian production systems (M24)
- D.3.2 Open-source data platform/s based on multiple data and sources to support companies of different production sectors in the transition processes toward a more decarbonized and circular economy (M36)
- D.3.3. Environmental Footprint national and regional datasets for the main Italian production systems (M36)

## WP3 approach



## Expected outcomes:

- ❑ Development of LCI (Life Cycle Inventory) datasets for the main Italian production systems at agricultural (peaches and nectarines, table grapes, and some legumes, Cereal and Olive-Oil, Animal husbandry) and industrial level (foundries and tissue paper)
- ❑ Quantification of the Environmental Footprint of the above-mentioned main Italian production systems in relation to multiple impact categories such as climate change, resources use, water use, eutrophication, ...
- ❑ Identification of new efficient and circular strategies tailored to the specific sectors investigated, providing innovative solutions to facilitate the transition to industrial symbiosis models
- ❑ New tools for and business models for companies to support them in the transition to new organizational models

## The elements inserted in the table for the platform development

Data name	Description	Data use	If "output" in column J, please specify the "Data name" of the data inputs	Data format	Observational granularity	Geographical granularity	Time granularity	Data observation period	Ingestion mode with AMELIA	Data you would like to bring in AMELIA
Life Cycle Inventory (foundries and tissue-paper sectors)	input of materials and energy and output (waste, emissions) relative to an average representative product for the sector under investigation	Input		xls	Companies	Nuts1	Yearly	2022-2023	Manual (upload)	indicator computed from the aggregated limited-access data
Life Cycle impact assessment (foundries and tissue-paper sectors)	Environmental Footprint in relation to multiple impact categories e.g. climate change, resources use, water use, eutrophication ...	Output	Life Cycle Inventory	xls	Companies	Nuts1	Yearly	2022-2023	Manual (upload)	indicator computed from the aggregated limited-access data
Material and energy inventories related to production and transformation of: peaches and nectarines, table grapes, and some legumes.	1) agricultural yields; 2) energy sources; 3) abiotic resources; 4) seeds; 5) pesticides and fertilisers; 6) auxiliaries; 7) transports; 8) onfield emissions; 9) waste	Output	Datasets of inventories and environmental impact indicators	csv, .xls, .pdf, etc.	Territorial entity, organizations, others	Nuts1	Yearly	tentatively 2020-2023	Manual (upload)	indicator computed from the aggregated limited-access data

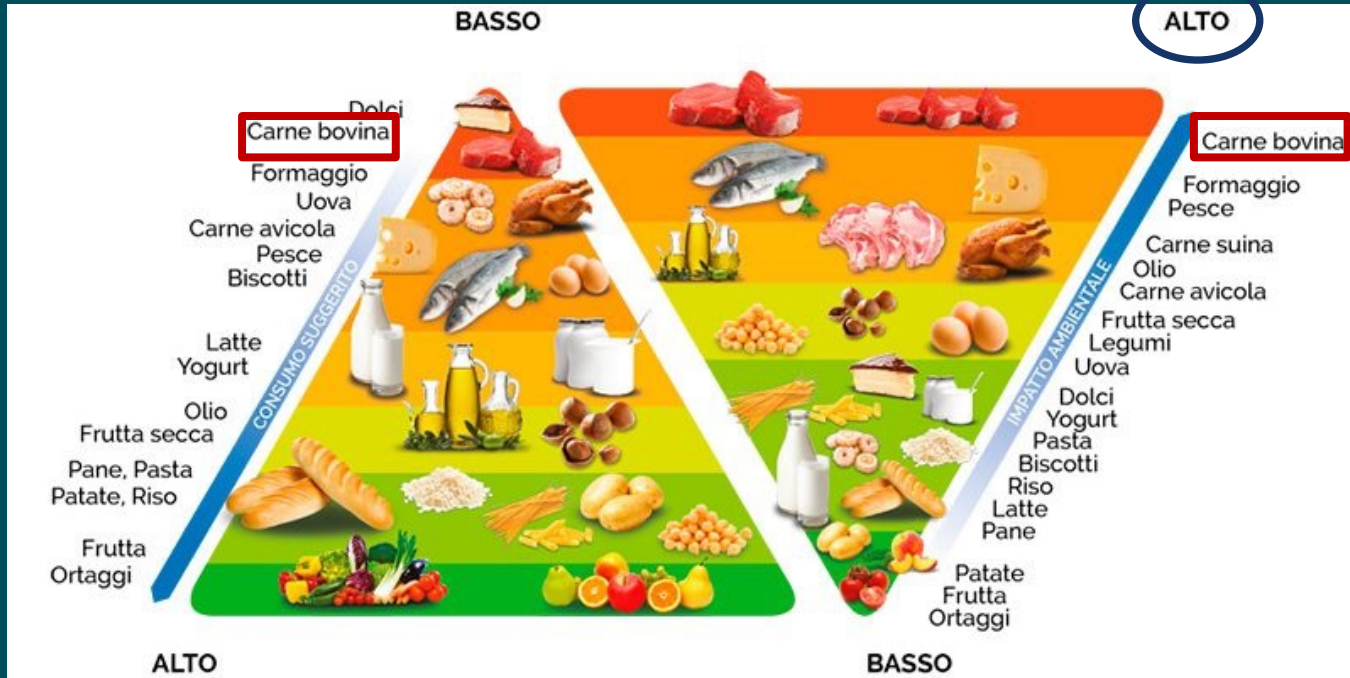


## The elements inserted in the table for the platform development

Data name	Description	Data use	If "output" in column J, please specify the "Data name" of the data inputs	Data format	Observational granularity	Geographical granularity	Time granularity	Data observational period	Ingestion mode with AMELIA	Data you would like to bring in AMELIA
Macro-data of crops investigated	Production, harvested areas, import/export, number of producers per production areas	Output	Territorial Mapping of the crop production sector investigated	csv, .xls, .pdf, etc.	Territorial entity, organizations, others	Nuts1	Yearly	tentatively 2020-2023	Manual (upload)	Full open
Background data	Data on material and energy production processes, waste treatment processes, material and energy supply transports, and so on	Output	Datasets of inventories and environmental impact indicators	csv, .xls, .pdf, etc.	Territorial entity, organizations, others	Nuts0	Yearly	tentatively 2020-2023	NA	NA
Geo-referenced data in the national and regional territories	Pedoclimatic data, localization of crop production area	Output	Mapping of the crops distribution on national and regional scale	Null	Territorial entity, organizations, others	Nuts1	Yearly	Current	Manul (upload)	indicator computed from the aggregated limited-access data



# Impatto ambientale della carne bovina



# Datasets relativi all'allevamento dei bovini



Età (mesi)	Sesso	Nome	Database				Totale
			Ecoinvent 3	AGRIBALYSE 3	Agri-footprint 5	World Food LCA Database	
6-12	M	Vitellino	10	9			28
	F	Vitellina	6	3			
12-24	M	Vitellone/Torello	11	7		7	39
	F	Giovenca/Manza	10	4			
> 24	M	Toro/Bue	3	2		1	16
	F	Vacca	5	6			
<b>Totale</b>			<b>45</b>	<b>31</b>	<b>1</b>	<b>7</b>	<b>84</b>

Avoided products			
Inorganic nitrogen fertiliser, as N {IT}   market for inorganic nitrogen fertiliser, as N   Cut-off, U	1,26E-04 kg	N from manure ready for spreading on the ground - stable management	
Inorganic phosphorus fertiliser, as P2O5 {IT}   market for inorganic phosphorus fertiliser, as P2O5   Cut-off, U	5,03E-05 kg	P from manure ready for spreading on the ground - stable management	
Inorganic potassium fertiliser, as K2O {IT}   market for inorganic potassium fertiliser, as K2O   Cut-off, U	1,43E-04 kg	K from manure ready for spreading on the ground - stable management	

Resources			
Water, well, IT	1,17E-02 l	Water for hygiene - stable management	
Water, well, IT	4,67E-02 l	Water for air conditioning - stable management	
Occupation, artificial areas, IT	7,90E-03 m <sup>2</sup> a	Occupation land - stable management	

Materials/fuels			
Tap water {Europe without Switzerland}   tap water production, conventional treatment   Cut-off, U	4,90E-02 kg	Water for animal watering	
Durum wheat straw, at farm {IT} - Adapted from WFLDB U	3,49E-03 kg	Bedding straw - ILCIDAF Database	
Diesel, burned in agricultural machinery {GLO}   diesel, burned in agricultural machinery   Cut-off, U	1,03E-05 MJ	Diesel - stable management	
Lubricating oil {RER}   market for lubricating oil   Cut-off, U	5,62E-07 kg	Lubricant oil - stable management	
<b>Corn silage cultivation for cattle Italy</b>	<b>9,37E-03 kg</b>	<b>Cattle feed: Corn silage fraction</b>	} ➤ <b>Fase agricola nazionale e regionale</b>
<b>Other forages cultivation for cattle Italy</b>	<b>4,68E-03 kg</b>	<b>Cattle feed: fodder fraction</b>	
<b>Concentrate for cattle feed (Italy mix)</b>	<b>9,37E-03 kg</b>	<b>Cattle feed: concentrates fraction</b>	
Fatty acid distillates (palm oil), at processing {NL} Economic, U	7,03E-04 kg	Vegetable oil	
Chemical, inorganic {GLO}   market for chemical, inorganic   Cut-off, U	1,41E-04 kg	Calcium carbonate	
Chemical, inorganic {GLO}   market for chemical, inorganic   Cut-off, U	7,03E-05 kg	Calcium hydrogen carbonate	➤ <b>Importazioni</b>
Chemical, inorganic {GLO}   market for chemical, inorganic   Cut-off, U	4,68E-05 kg	Calcium dihydrogen phosphate	➤ <b>Fase di lavorazione</b>
Chemical, inorganic {GLO}   market for chemical, inorganic   Cut-off, U	7,03E-05 kg	Vitamin supplement	
Chemical, inorganic {GLO}   market for chemical, inorganic   Cut-off, U	7,03E-05 kg	Sodium chloride	
Polyethylene, LDPE, granulate, at plant/RER	2,09E-05 kg	Granulated PE bags for food ration	
Extrusion, plastic film {RER}   extrusion, plastic film   Cut-off, U	2,20E-05 kg	PE film bags for food ration	
Polypropylene, granulate {RER}   polypropylene production, granulate   Cut-off, U	3,14E-06 kg	Granulated PP big bag for food ration	
Extrusion, plastic pipes {RER}   extrusion, plastic pipes   Cut-off, U	3,14E-06 kg	Big bag PP film for food ration	
Weaving, synthetic fibre {GLO}   weaving of synthetic fibre, for industrial use   Cut-off, U	3,14E-06 kg	Big bag PP fibers for food ration	
Kraft paper, unbleached {RER}   kraft paper production, unbleached   Cut-off, U	1,05E-05 kg	Paper bags for food ration	

### Electricity/heat

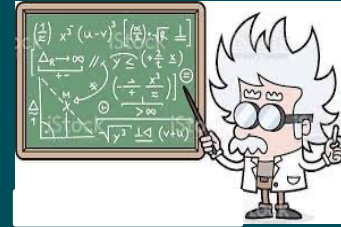
Electricity, medium voltage {IT}   market for electricity, medium voltage   Cut-off, U	2,43E-04 kWh	Electricity - stable management
Electricity, medium voltage {IT}   electricity, medium voltage, residual mix   Cut-off, U	3,66E-04 kWh	Mains electricity for food ration preparation
Electricity, medium voltage, renewable energy products {CH}   market for electricity, medium voltage, renewable energy products   Cut-off, U	4,19E-06 kWh	Renewable electricity for food ration preparation
Electricity, low voltage {IT}   electricity production, fotovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted   Cut-off, U	3,14E-06 kWh	Photovoltaic electricity for food ration preparation
Heat, district or industrial, natural gas {RER}   market group for heat, district or industrial, natural gas   Cut-off, U	1,54E-03 MJ	Methane for food ration preparation
Electricity, high voltage {IT}   heat and power co-generation, natural gas, conventional power plant, 100MW electrical   Cut-off, U	3,77E-05 kWh	Electricity from co-generator for food ration
<b>Emissions to air</b>		
Methane, biogenic	5,28E-01 g	Methane - Enteric fermentation
Methane, biogenic	1,95E-02 g	Methane - Manure Management
Dinitrogen monoxide	5,65E-03 g	Direct dinitrogen monoxide - Manure Management
Dinitrogen monoxide	3,03E-03 g	Indirect dinitrogen monoxide volatilization - Manure management
Dinitrogen monoxide	5,75E-05 g	Indirect dinitrogen monoxide leaching - Manure management
Ammonia	1,67E-01 g	Ammonia - Manure management

### Waste to treatment

End-of-life lubricant oil	5,62E-07 kg	End-of-life lubricant oil - stable management
End-of-life plastic packaging	2,09E-05 kg	End of life PE granulated bags for food ration
End-of-life plastic packaging	2,20E-05 kg	End of life PE film bags for food ration
End-of-life plastic packaging	3,14E-06 kg	End of life Granulated PP bags for food ration
End-of-life plastic packaging	3,14E-06 kg	End of life PP film bags for food ration
End-of-life plastic packaging	3,14E-06 kg	End of life PP fiber bags for food ration
Recycling paper and cardboard, waste management, technology mix, at plant {EU+EFTA+UK}   collection, sorting, transport, recycling   production mix, at plant   paper waste, efficiency 90,9%   LCI result	1,05E-05 kg	End of life paper bags for food ration

Scenario italiano  
di fine vita

## Data set che andranno su Amelia



- 3 attitudini x 6 (sesso/età) = 18 Datasets nazionali riferiti alla singola attitudine
- 37 razze pure x 6 (sesso/età) = 222 Datasets nazionali riferiti alla singola razza pura
- 22 razze meticce x 6 (sesso/età) = 132 Datasets nazionali riferiti alla singola razza meticcica
- 21 Dataset regionali x 6 (sesso/età) = 126 Datasets regionali riferiti a tutti i bovini in ogni regione

**Totale = 498 datasets  
statistici per l'allevamento  
dei bovini in Italia**

**+ datasets nazionali e regionali  
relativi alla coltivazione dei  
componenti della razione  
alimentare**



# Future works

- Raccolta di dati primari sul campo
- Utilizzo di droni con sensori per misurare le emissioni di  $\text{CH}_4$  dagli allevamenti

Emissioni ( $\text{CO}_2$ )<sub>totale</sub> = 2,06 Mg  $\text{CO}_2$  equ anno<sup>-1</sup>



(GWP<sub>100</sub> = 28,5)

+13,2%

Bovino Piemontese 12 – 24 mesi

Emissioni ( $\text{CO}_2$ )<sub>totale</sub> = 1,82 Mg  $\text{CO}_2$  equ anno<sup>-1</sup>

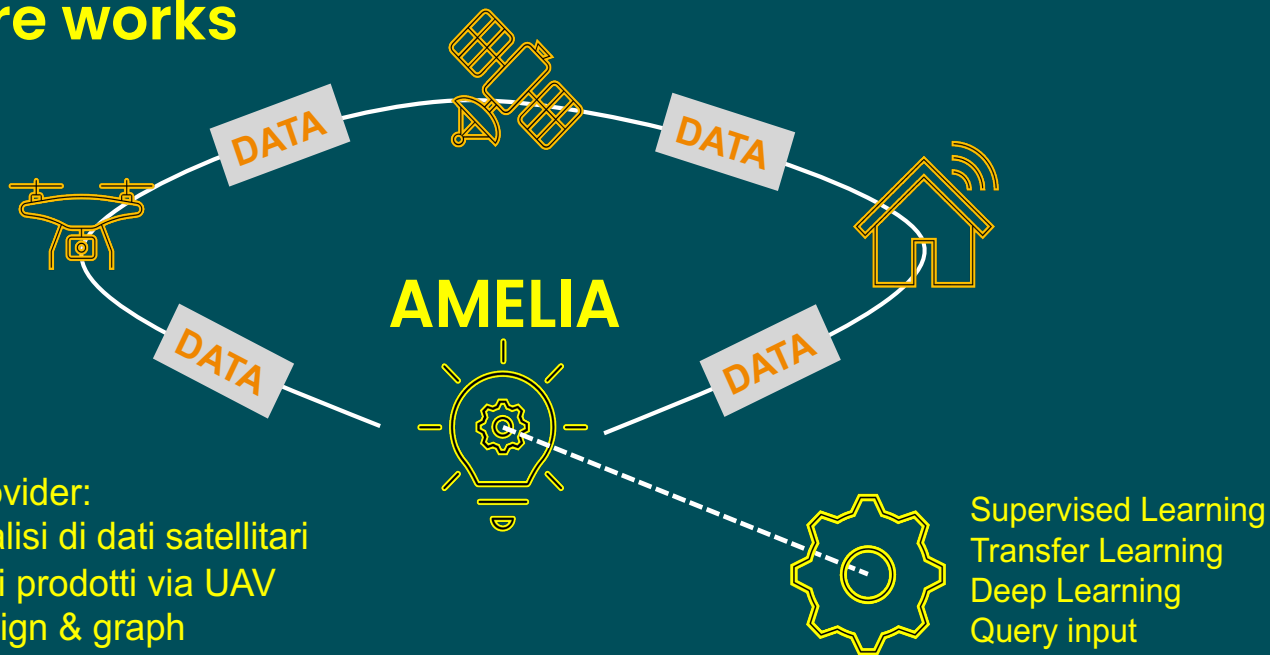


145–147 g  $\text{CO}_2$  Km<sup>-1</sup>

Distanza media annua = 12.463 km



## Possible Future works



### Data Analyst & Data Provider:

- Tool e librerie per analisi di dati satellitari
- Tool di analisi per dati prodotti via UAV
- Strumenti di data design & graph
- Ambiente di lavoro GIS

### Enti di governo, Gestori di attività, ecc:

- Accesso a database via query
- Visualizzazione interattiva di dati precostituiti
- Richiesta di specifiche attività di monitoraggio

# SPOKE 1 FIRMS

## WP4 – Improving territories' value creation by supporting business sustainability

WP Members:

Vera Palea (Coordinator), Elisa Giacosa, Laura Corazza, Giulio Caldarelli, Sona Kalantaryan – UniTo

Lino Cinquini – Scuola Sant'Anna

Mascia Bedendo, Lorenzo Dal Maso, Gianluca Tassinari – UniBo

Chiara Mio, Marco Fasan, Francesco Scarpa – UniVe

Gloria Fiorani, Chiara Di Gerio, Emanuele Doronzo – Tor Vergata

Debora Giannini, Marco Pini, Lucrezia Macigno – Centro Tagliacarne



## WP4 – Improving territories' value creation by supporting business sustainability

### WP objectives:

- ❑ To map business sustainability by connecting company information (e.g., financial and managerial accounting, sustainability reporting, corporate governance variables, business models, strategies, practices, purposes, cross-sectoral collaboration) of SMEs operating in the pilot territories (i.e., Italian regions from North, Central and South);
- ❑ To perform a comprehensive clustering of practices in company management in the pilot territories;
- ❑ To measure the business sustainability of pilot territories (industrial districts, supply chains, networks of firms,...) to ESG factors, also regarding macro-economic trends.

### List of activities and description:

1. Collection and integration of financial accounting data with indicators from management accounting, sustainability accounting and reporting (carbon footprint, circular economy and ESG indicators, sustainability reports if available), quali/quantitative data (retrieved using surveys) provided by the territory's SMEs, and scenario analyses;
2. Development of an open source web based geo-referenced map(s) on business sustainability.

### List of deliverables:

- D.4.1** Web-based geo-referenced map, knowledge engine and data visualization;
- D.4.2** Measures of business sustainability;
- D.4.3** Long-term multi-stakeholder engagement system;
- D.4.4** Guidelines/toolkits for business sustainability management and territories' value creation

## Expected outcomes:

- ❑ Building a map of territories and their industrial sectors indicating/visualizing their readiness level for climate change (mitigation and adaptation strategies)
- ❑ Developing a statistical assessment model for business readiness level to climate change, including in relation to competitors, to be made available open access
- ❑ Identifying competencies and internal organizational aspects within the company that effectively support mitigation and adaptation strategies for climate change
- ❑ Identifying weaknesses and obstacles to transition and adaptation strategies for evaluating subsequent policy initiatives.

## Data sources

### Primary

SME survey

1. Risk perception (acute physical risk, chronic physical risk, transition risk)
2. Green investment (past, future)
3. Emissions (objectives, measurement, etc)
4. Reporting and personnel policies
5. Sustainable finance
6. Companies characteristics
7. University/Region specific set of questions

### Secondary

Enterprise-level data (e.g. AIDA database)

Benchmark surveys (e.g. EIB survey, Centro Tagliacarne)

Regional indicators from Istat and Eurostat

Survey Design  
2023 Autumn

Consultations  
2024 Winter

Implementation  
2024 Spring

Data analysis  
2024 Summer

## The elements inserted in the table for the platform development

Data name	Data use	If "output" in column J, please specify the "Data name" of the data inputs	Data format
Indicators regarding companies' green strategies, their characteristics, and sustainability impact	Output	Data inputs from the survey merged with other databases	XLS, CSV
Algorithm for assessing the level of preparedness of businesses in terms of mitigation and adaptation.	Input (algorithm on the data)	Data inputs from the survey merged with other databases	TBD
Heat maps of the preparedness level of regions/industrial sectors in terms of mitigation and adaptation.	Output/Input (maps/algorithm on the data to create maps)	Data inputs from the survey merged with other databases	TBD

**Grazie per l'attenzione**

