

# LATAM & European Network BERSTIC: Engineering Business Opportunities based on Science, Technology, Innovation & Culture

Founder and CEO, Prof. Dr Ramón Fernando Colmenares-Quintero



Science, Technology, Innovation and Culture  
LATAM & European Network



Engineering  
**Research**  
Institute

# Fernando Colmenares – Short Biopic

I am a mechanical and aeronautical engineering from the Warsaw University of Technology in Poland, with a Master's in engineering specialising in turbine engines and internal combustion from the same institution. I honed my engineering project management skills at the Universidad EAN in Colombia and earned a PhD in engineering with a focus on energy systems and optimisation from Cranfield University, UK. I furthered my expertise as a postdoctoral research fellow in aerospace engineering at the same university. Currently, I serve as the CEO & Founder of the BERSTIC LATAM & European Network, and CEO of the Engineering Research Institute at the Universidad Cooperativa de Colombia. My trajectory reflects my dedication to engineering, research, and notably. My significant involvement in the hydrogen value chain, including education.



<https://www.linkedin.com/in/fernando-colmenares-58234179/>

# BERSTIC Network

Science, Technology, Innovation  
and Culture

## MISSION

BERSTIC Network is responsible for generating developments of applied scientific research, generation of fundamental knowledge, formation of highly qualified human capital for research, execution of training and technology-based projects and innovation, technology transfer, extension of technology and technological services, dissemination and social use of knowledge in an interdisciplinary and multicampus way and with national and international impact.



## VISION

By 2030 we will be a leader in research, development and innovation issues aligned with global challenges in relation to the nexus of energy, water, biomass and smart territories. The aspiration of the BERSTIC Network is to generate innovative solutions to intractable development problems, identify viable pathways towards healthier and safer lives, sustainable development and prosperity for all, equal and effective education, social justice and human rights and stable institutions.





# BERSTIC Network

Science, Technology, Innovation  
and Culture



**Science, Technology,  
Innovation and Culture**



**International  
Cooperation Congresses  
in Different Countries**



**100+ International  
Partners**

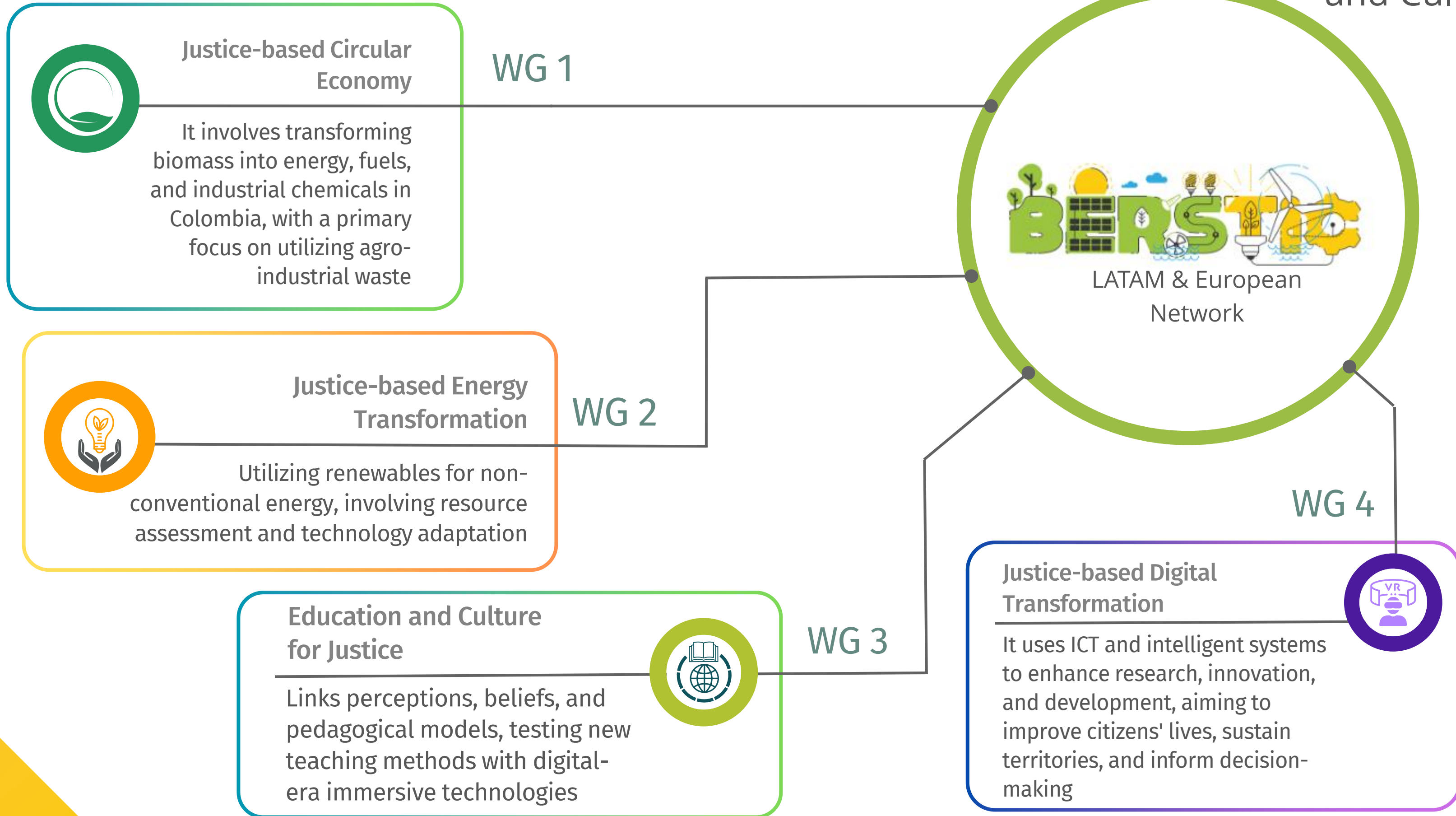


**Impacts at  
Different Levels**



# BERSTIC Network

Science, Technology, Innovation  
and Culture



# International Congress on Biorefineries and Renewable Energies Supported by ICTs - BERSTIC



I International Congress on Biorefineries and Renewable Energies Supported by ICTs - BERSTIC 2018  
Medellín, Colombia



II International Congress on Biorefineries and Renewable Energies Supported by ICTs - BERSTIC 2020  
Bucaramanga, Colombia



III International Congress on Biorefineries and Renewable Energies Supported by ICTs - BERSTIC 2022  
Medellín, Colombia



IV International Congress on Biorefineries and Renewable Energies Supported by ICTs - BERSTIC 2024  
Warsaw, Poland



# BERSTIC III Congress Outcomes and Impacts



30+ Proposals

## Summary of the III International BERSTIC Congress

Medellín, Colombia

### On a social level



Research projects with community participation

School of weaving and knowledge

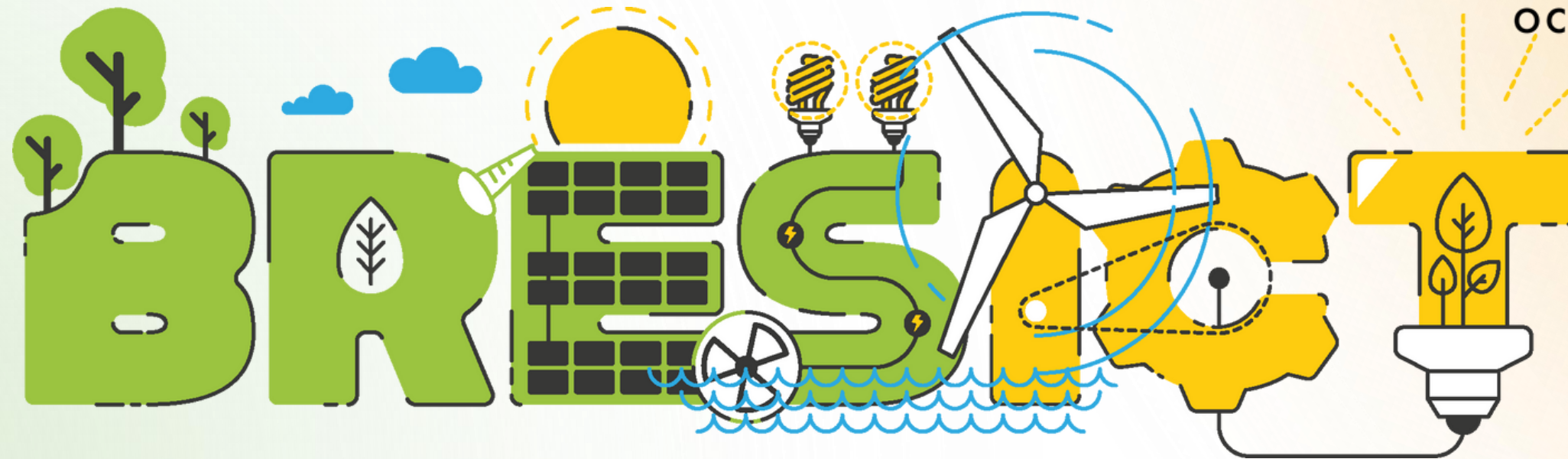
More than 100 students have participated.

### At curriculum level



Forums, co-creation workshops, seminars for undergraduate and postgraduate students with the participation of international experts





OCEANS OF ENERGY



DOM3E



NIBIO NORSK INSTITUTT FOR BIOØKONOMI



WARSAW UNIVERSITY OF LIFE SCIENCES

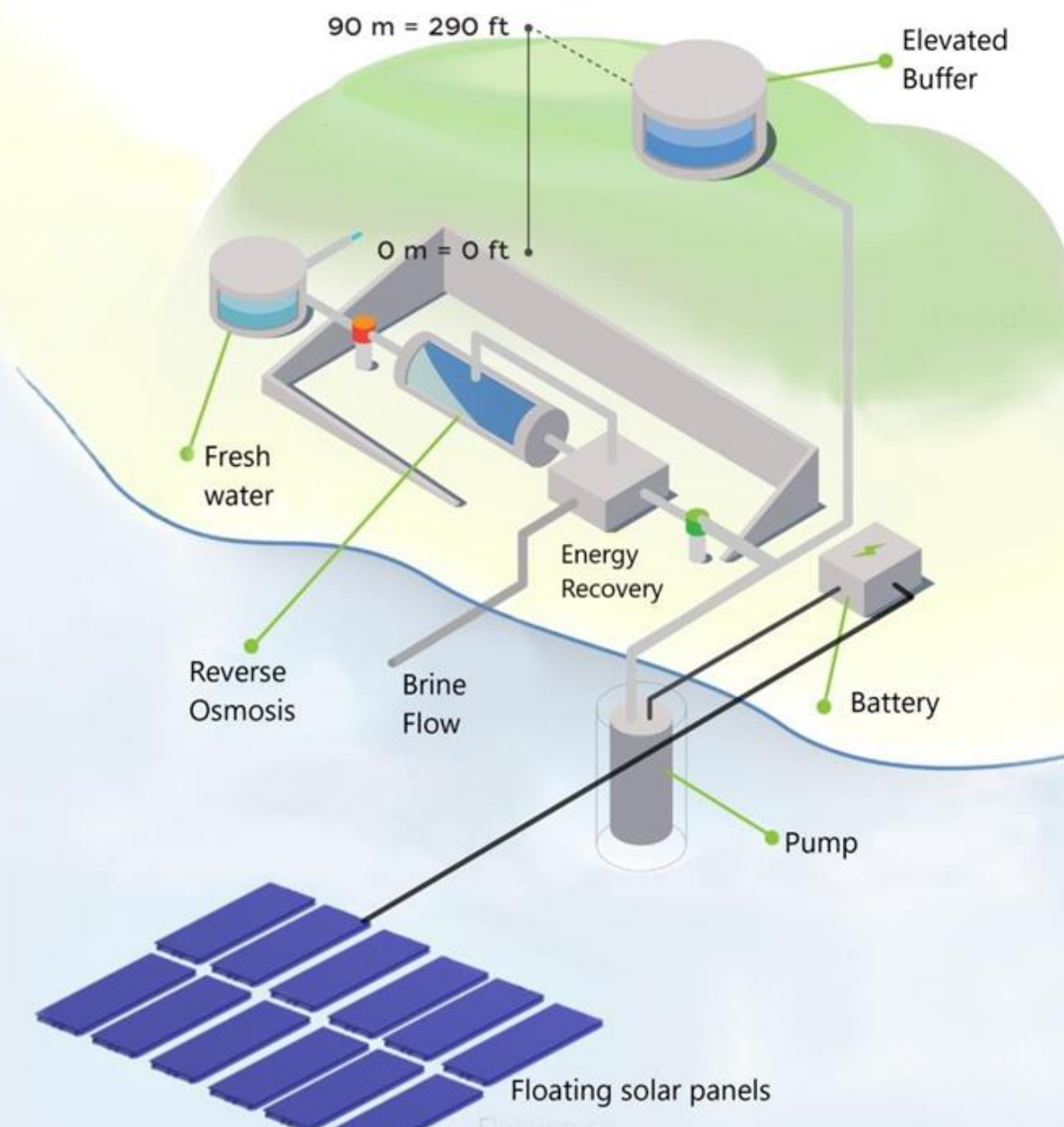


UNIVERSIDAD DE CORDOBA



# BERSTIC's Resulting Projects

## Sustainable Water by floating solar Energy powered Efficient reverse osmosis Treatment: SWEET Project



The consortium is made up of the two companies from Holland and the representation of the academy from Colombia, sponsored by the Partners voor Water fund of the Dutch Government.

- A small-scale desalination facility was built, with the capacity to supply the daily water needs.
- The project greatly reduces the costs of importing water and diesel and saves greenhouse gas emissions by replacing the transport of water and diesel.
- The development of the project results in high publicity and a green image; the operation of the SWEET facility generates new employment opportunities.



OCEANS OF ENERGY

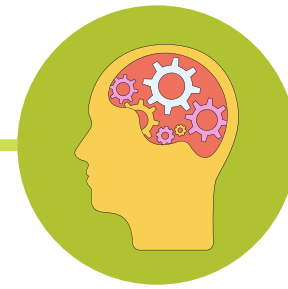
# Other BERSTIC ARE projects

2016 - 2017



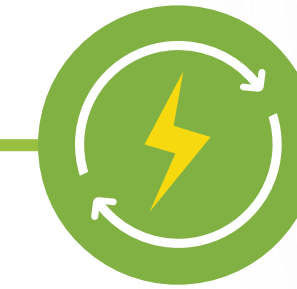
*Accelerating Marine & Run of River Energy in Colombia: Industry-Academia Partnership Programme*

2018 - 2019



*Identification of Knowledge Gaps in the Academia and Capacity Building for Aquatic Renewable Energy in Colombia*

2019 - 2021



*Enhancing Aquatic Renewable Energy (ARE): Technology design and adaptation programme for Colombia*



Partners



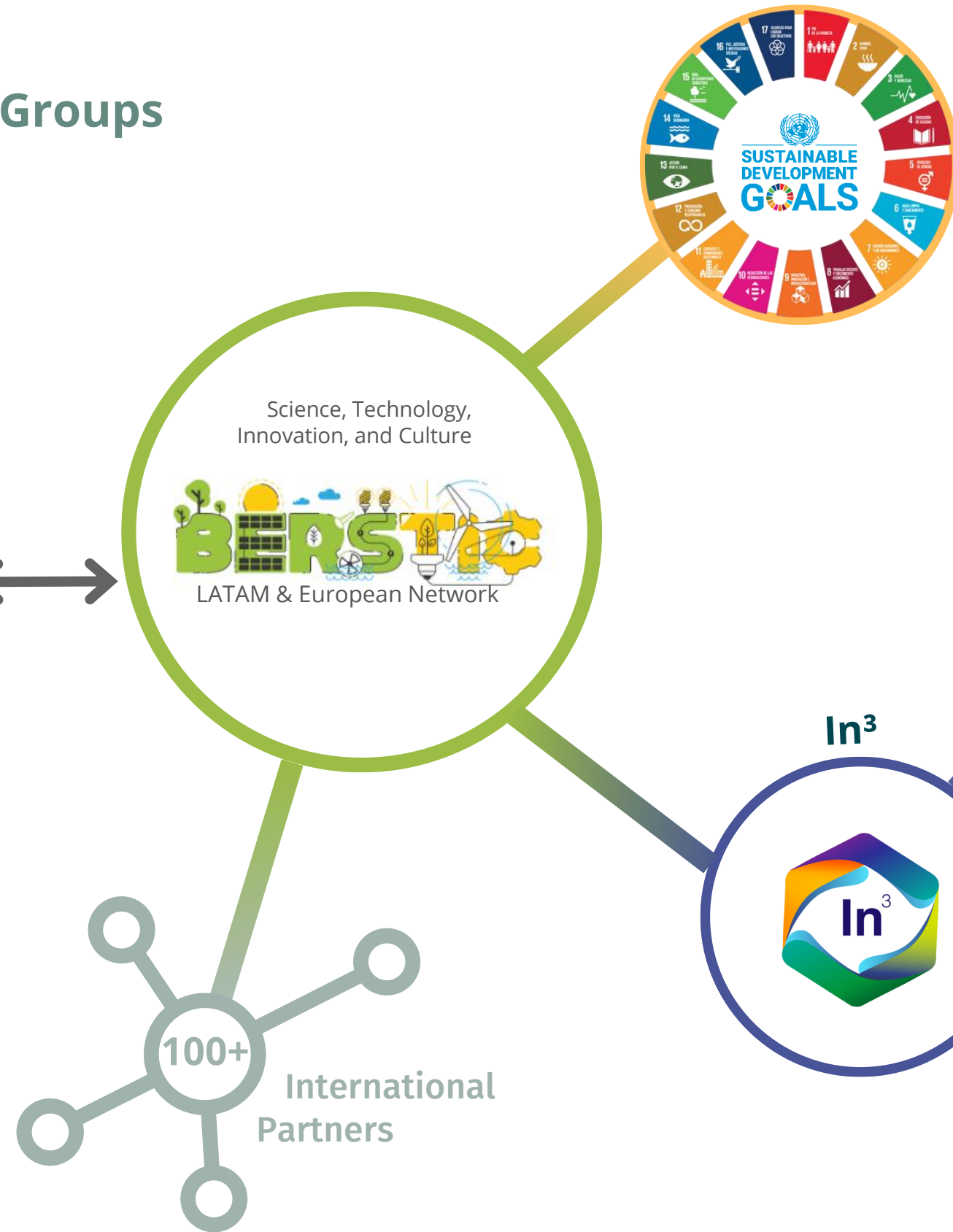
Universidad Cooperativa de Colombia





# Network Structure and In<sup>3</sup> role

## BERSTIC Working Groups



## service portfolio

- Intelligent monitoring systems
- Technological and commercial valorisation
- Creation of digital twins
- Training and consulting services
- Project management
- Accompanying services for calls for proposals

# Engineering Research Institute



## MISSION

The mission of the Engineering Research Institute is to generate knowledge and solutions within its lines of research through the articulation of national and international cooperation networks in science, technology, innovation and culture (STIC)

## VISION

By 2030, the Engineering Research Institute will be a global leader in science, technology, innovation and research, Aligned with the global challenge of the Sustainable Development Goals (SDGs), Mission of Expert and Internationalisation

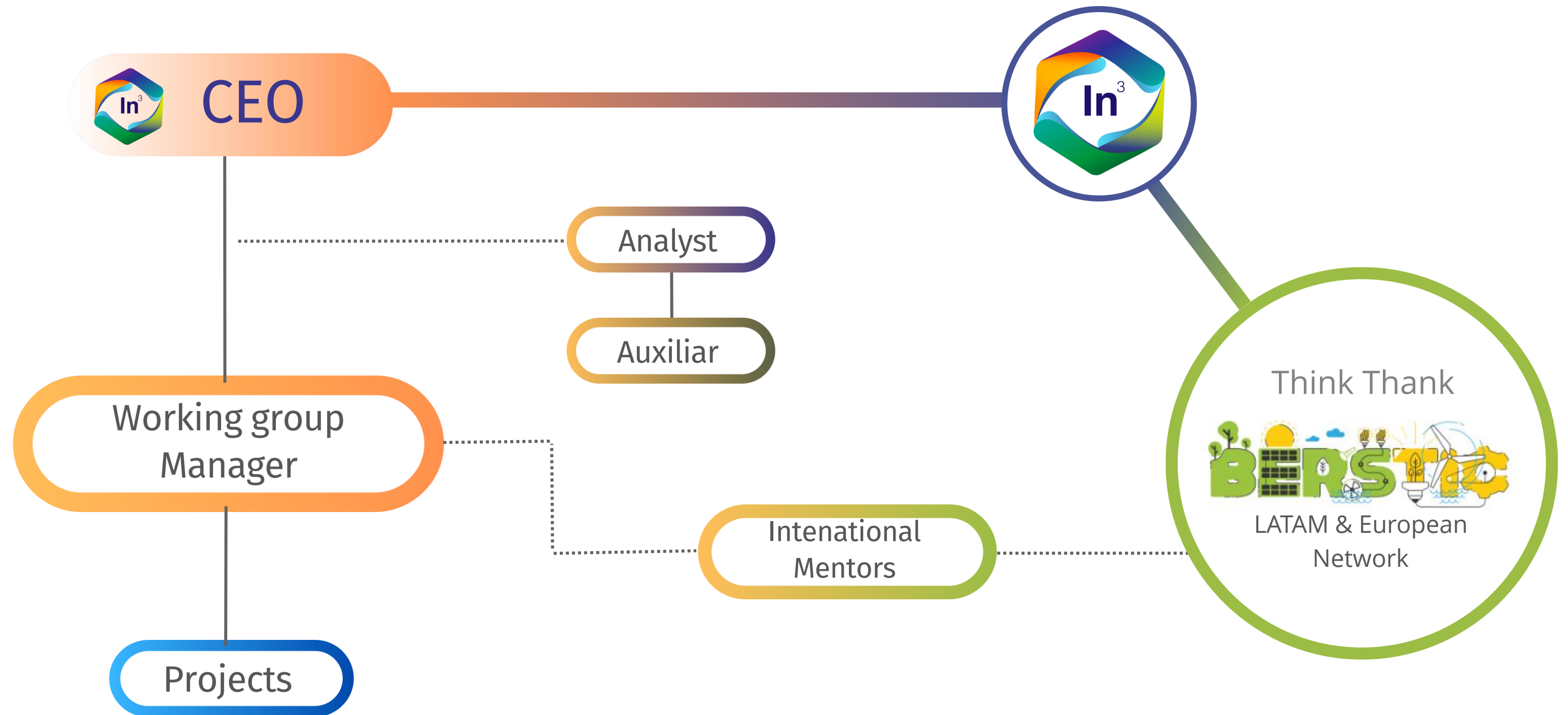


Science, Technology, Innovation, and Culture  
LATAM & European Network



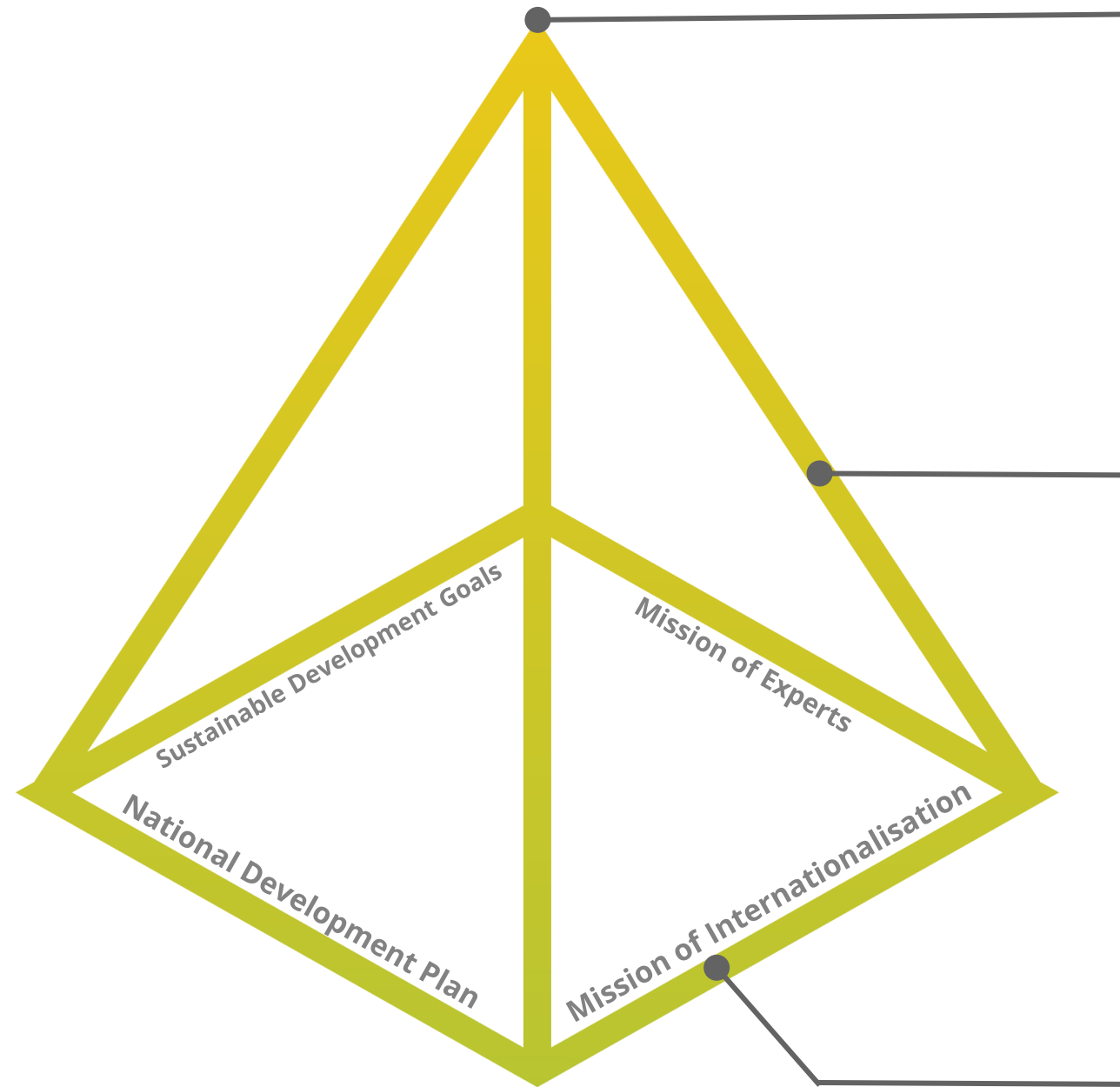
Instituto de  
**Investigación**  
en Ingeniería

# Engineering Research Institute Structure





# Objectives



To develop research projects in science, technology and innovation aimed at the development of the country with environmental, economic and social justice in mind, with financing from national and international funds



To train human capital capable of performing under the requirements of industry, government and communities through curricula and research projects created jointly between industry, national and international academia, communities and governments.



Develop and generate spaces for the social appropriation of science, technology and innovation based on the active participation of the various social groups that generate knowledge (industry, academia, society and government).



Science, Technology, Innovation, and Culture  
LATAM & European Network

# PERSONAL AND PROFESSIONAL



**MARIETH BAQUERO**

ELECTRONIC ENGINEER

It is a unique experience, as it has allowed me to improve in many aspects of my life, especially professionally, where I have been able to expose myself in events and situations that require me to do my best, and that contribute to my continuous improvement being accompanied by our team.



**LUIS GUARIN**

SYSTEMS ENGINEER

My experience being part of STIC has enriched me both personally and professionally, I have faced challenges that I think are taking me to another level of maturity, and it gave me the opportunity to start my working life and continue learning in parallel, it is giving me the opportunity to build my future as I want it.



**SALVADOR VILLAR**

ELECTRONIC ENGINEER

At STIC I have been in an environment of constant cooperation, we are a multidisciplinary team and from different territories, so it is very interesting and exciting. In turn, we mentor students from the Berstic seedbed, supporting kids who were in our position a while ago and wish to follow the path of science, technology, innovation and culture.

# GROWTH COMMUNITY



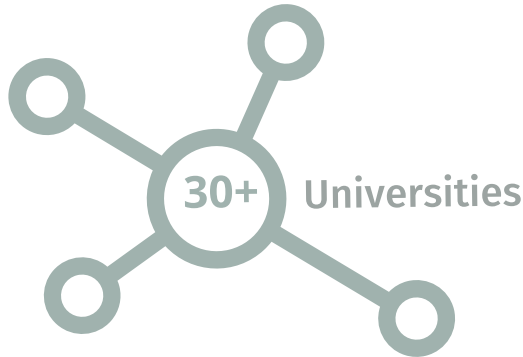
**To train human capital capable of performing under the requirements of industry, government and communities through curricula and research projects created jointly between industry, national and international academia, communities and governments.**





# BERSTIC Higher Education Institution Seedbed

- Students of the Universidad Cooperativa de Colombia from its 19 branches.
- Students of the Universidad de la Amazonía.
- Open to integrate other students





# BERSTIC SCHOOL SEEDBED

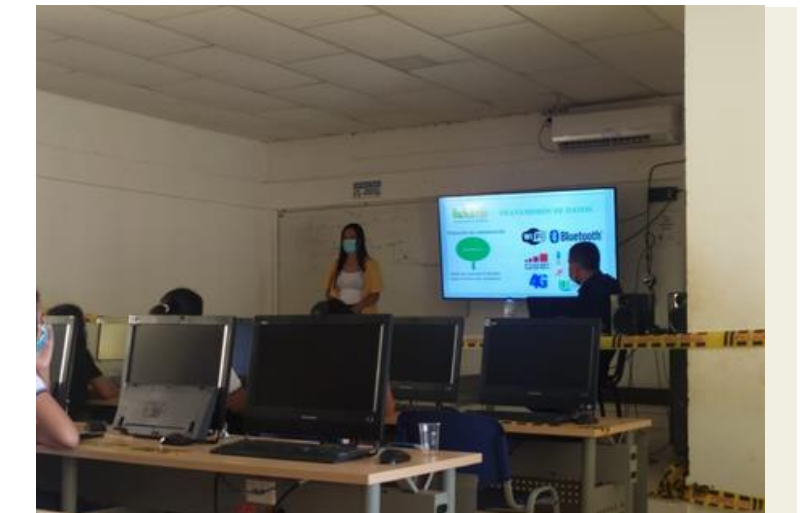
- Characterisation of needs
- Activities with students
- Sharing experiences
- Cooperating with the institutions
- Presentations about scientific method, renewable energies and intelligent systems
- Activitiy/laboratory guides and in energy solutions



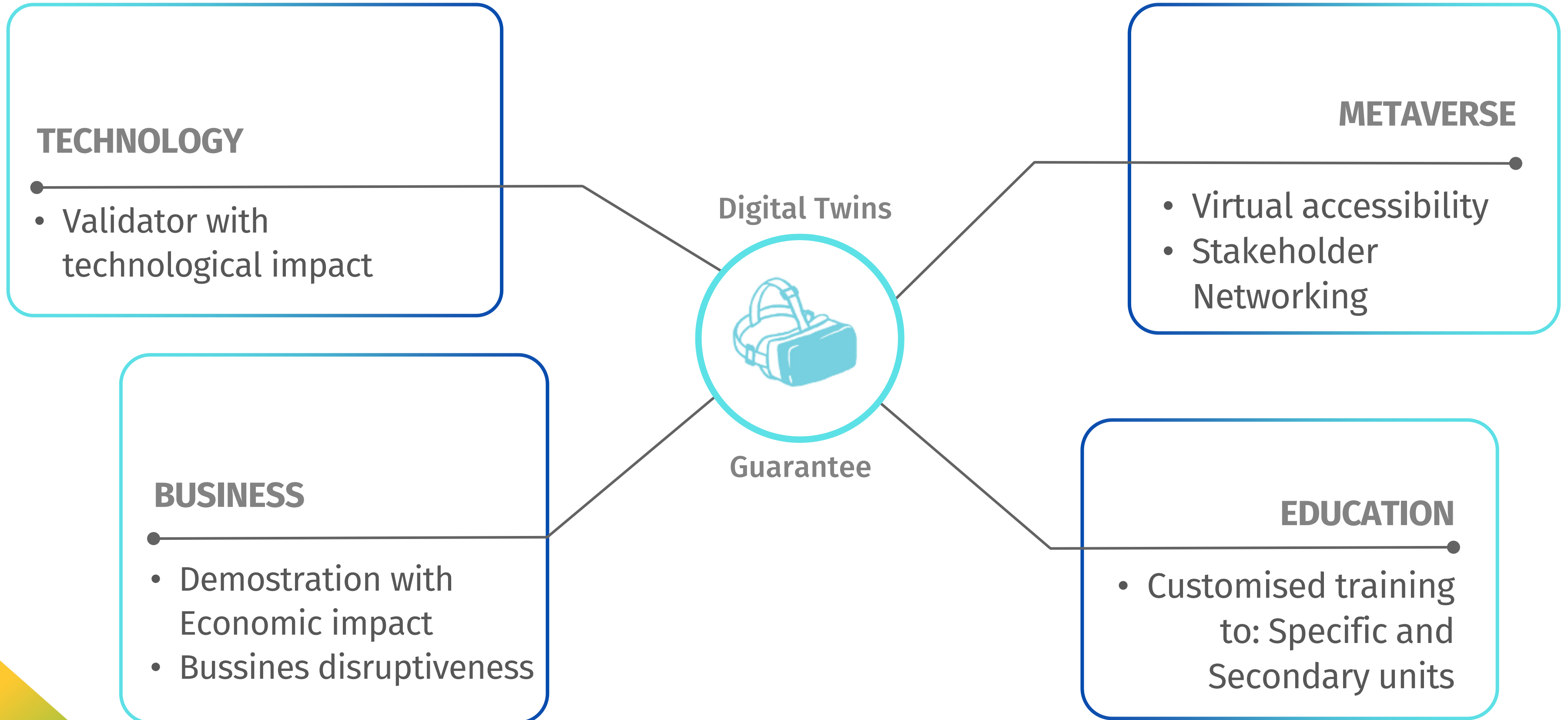
Institución Etnoeducativa Rural La Paz  
500+ Students  
Manaure, La Guajira 📍



Institución Educativa María Inmaculada  
700+ Students  
Puerto Carreño, Vichada 📍



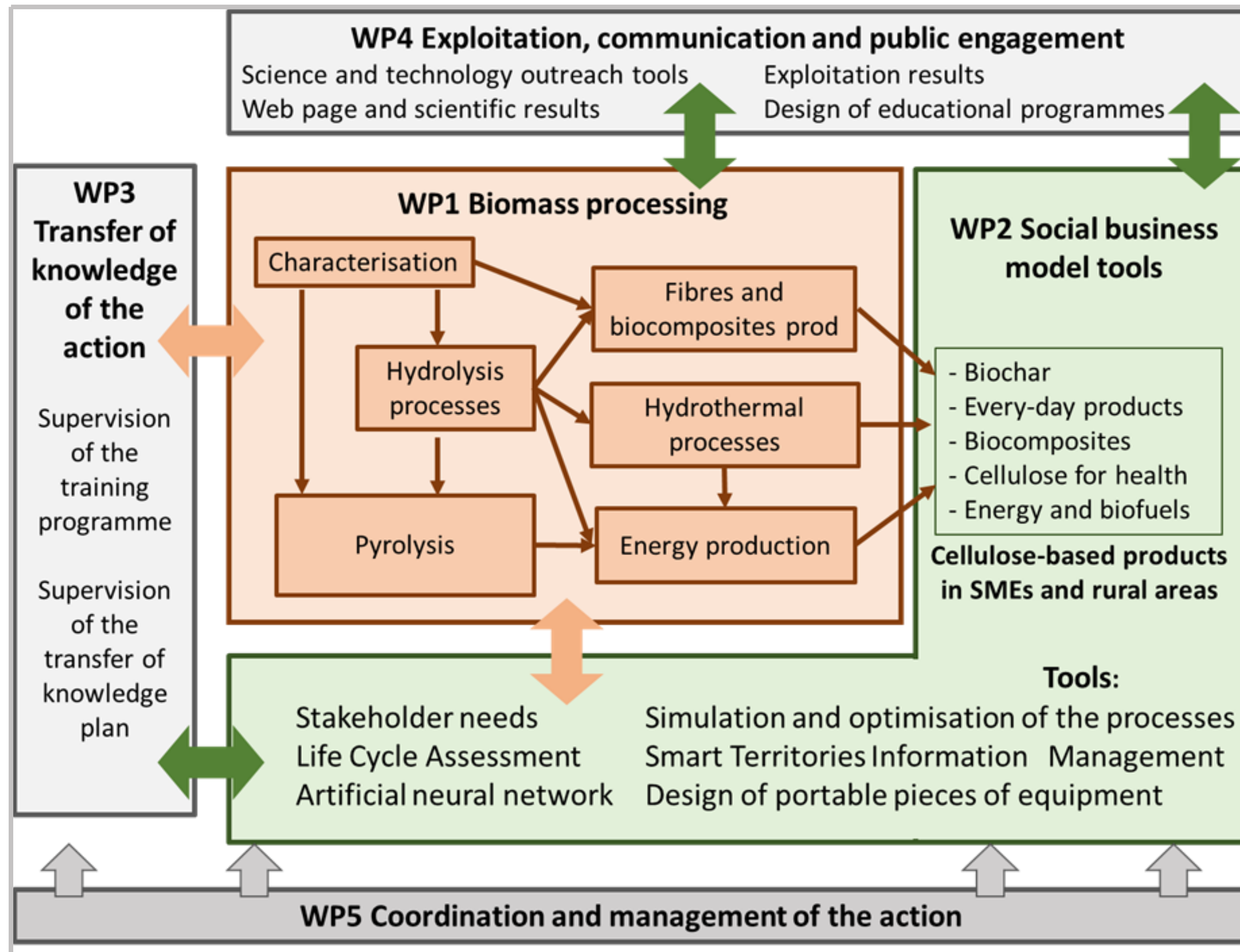
# In<sup>3</sup> Virtual Technology Validator





# In<sup>3</sup> Virtual Technology Validator

## Celise Project



Horizon 2020  
 European Union funding  
 for Research & Innovation





# Technology: Exeter retort by Carbon compost, UK



## CHARCOAL PRODUCTION

**BIOFUEL** from wood, cocoa, coffee residue pyrolysis -> **CHARCOAL**

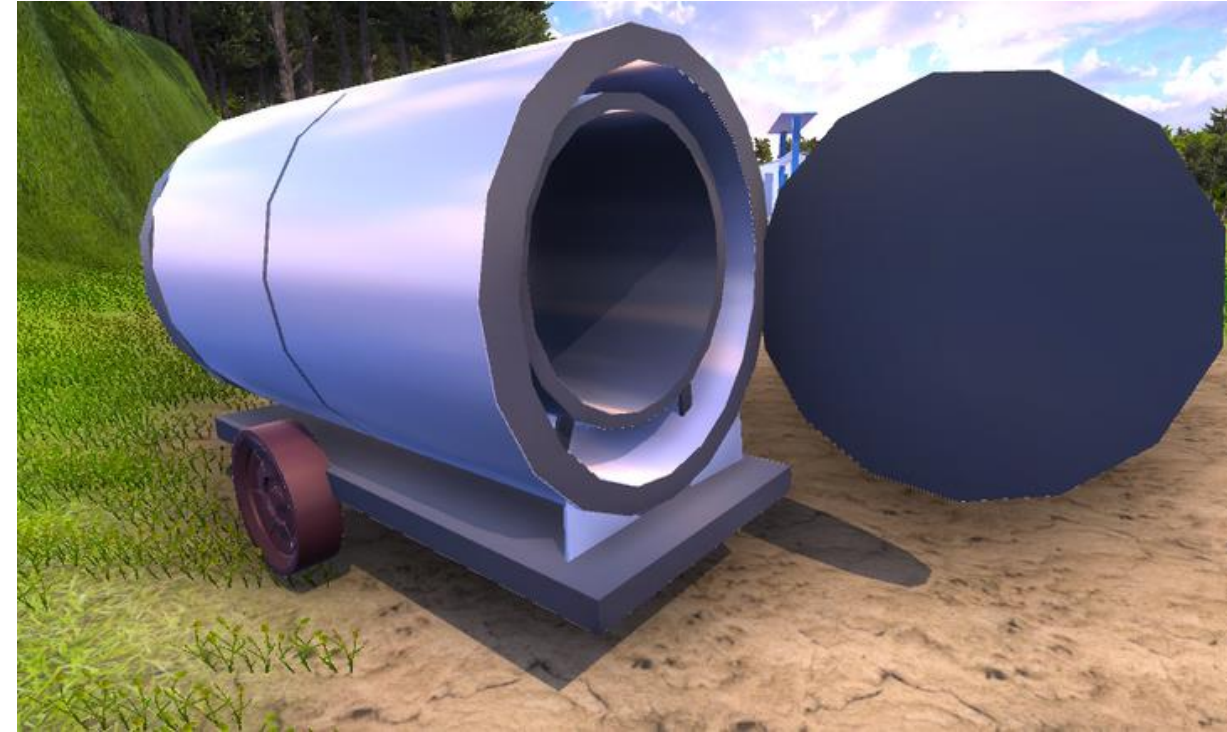




In-house develops



UK Real technology



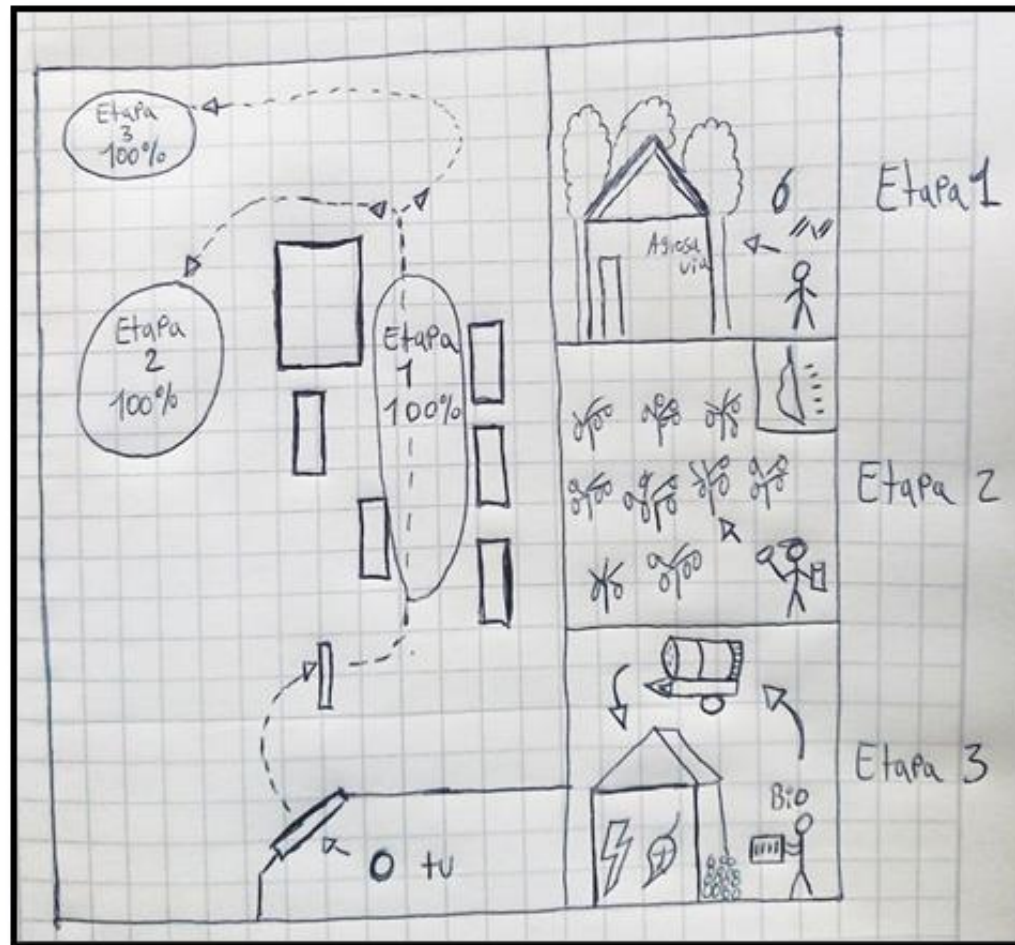
Digital Twin



Colombian Territory



# Gamification methodology



Research on the function and activities of the Exeter retort

1

Contextualize the participants about the dynamics in terms of the expected learning process.

2

Specify rules and activity time

3

Create reward systems

4

Obtain feedback on results (evaluate changes)



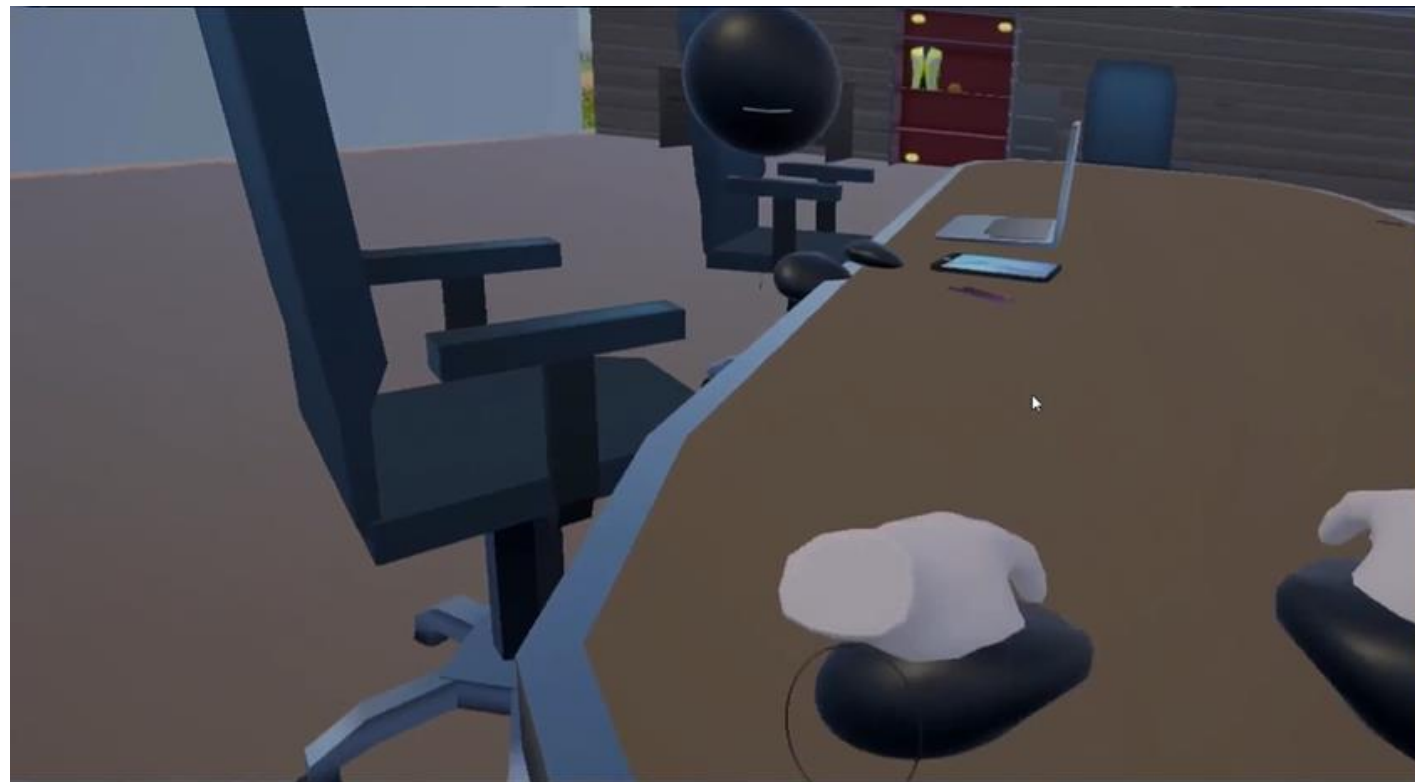
**PROJECT  
AGROLAND**  
CELISE



# Metaverse



## Meetings [Beta Version]





# Digital Twin Characteristics







UNIVERSIDAD  
COOPERATIVA  
DE COLOMBIA



AI voice generated - Fernando Colmenares

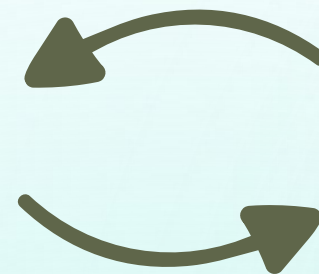




# Validation Process With Diferent Stakeholders

LATAM

EUROPE



UK Academia

Polish Institutes



# Benefits of Virtual Reality and Gamification



- VR training reduces the incidence of workplace injuries by 43%
- It is 4 times faster than the average face-to-face training.
- 39% of large organizations leverage AR/VR technology to facilitate training in simulated environments.

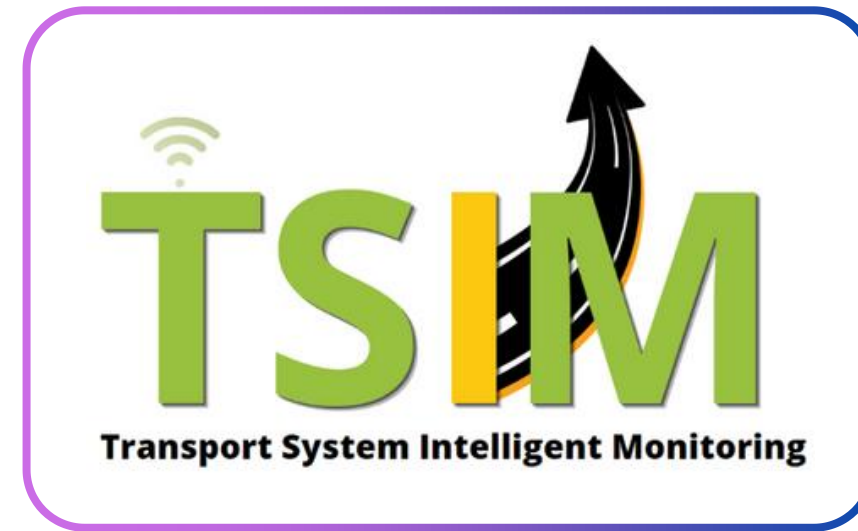


- More measurable results (levels, points and badges)
- Commitment to learning and loyalty on the part of the student with the content and with the tasks themselves
- More significant learning allowing greater memory retention by being more attractive

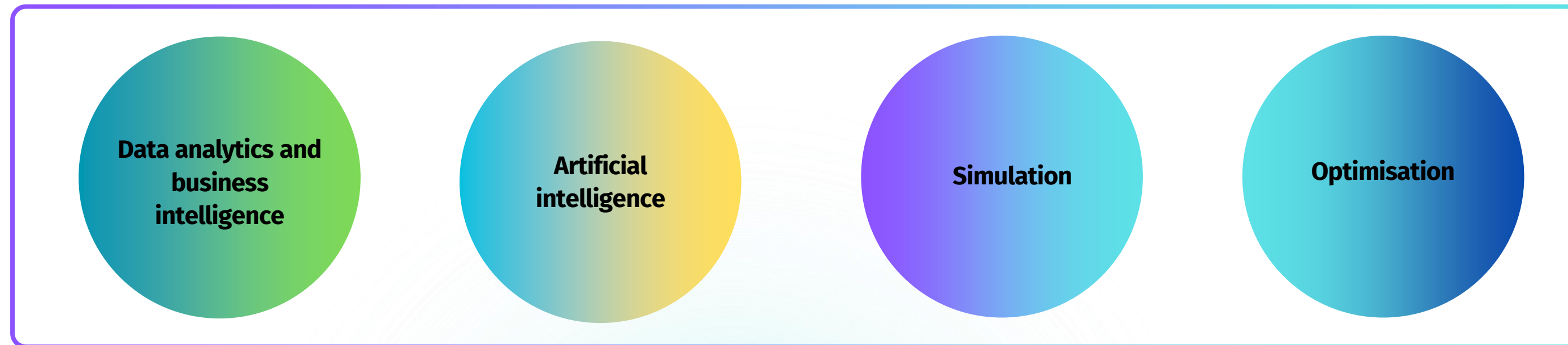




# Other projects



In-house Algorithms





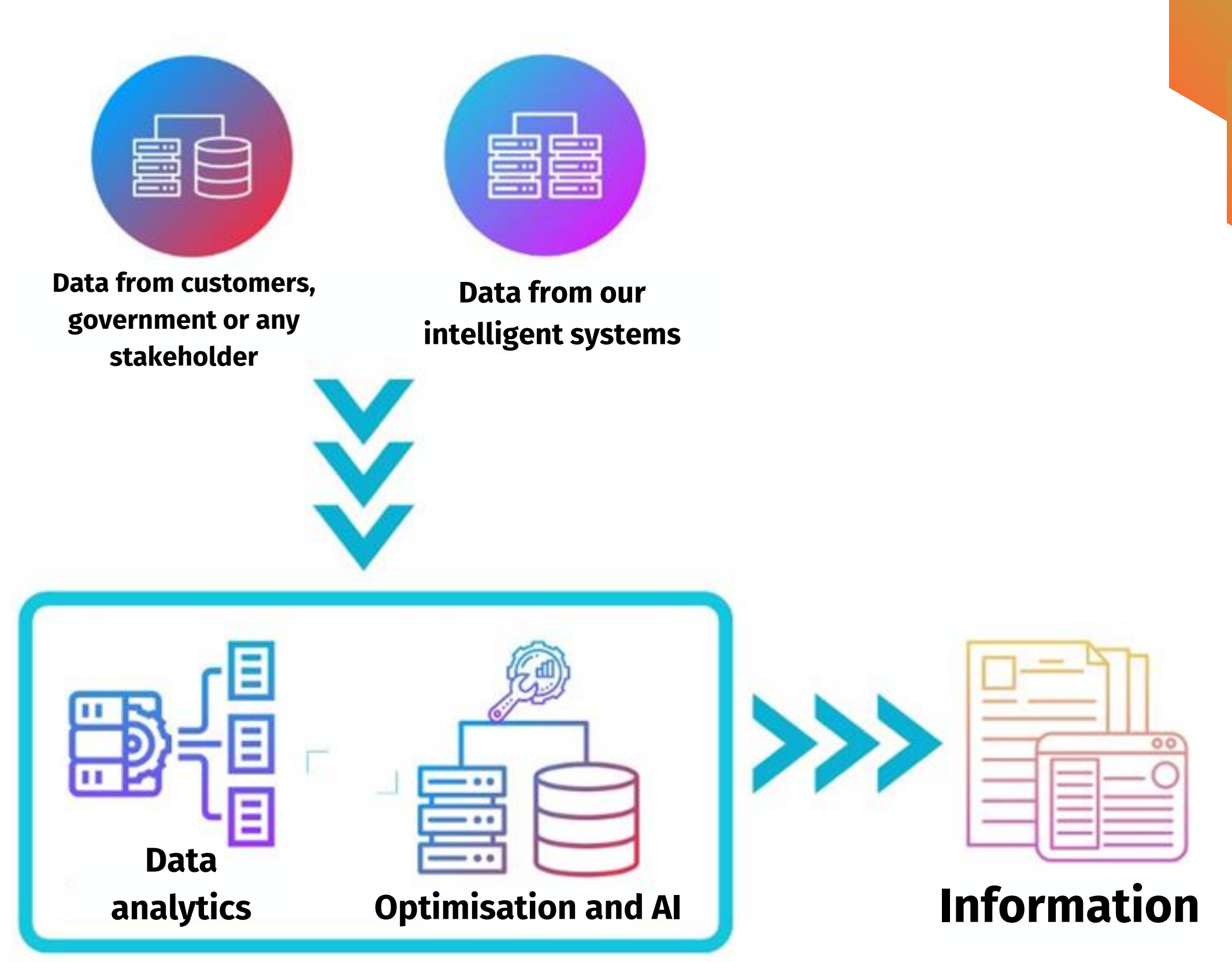
**PROTOTYPE FOR  
INTELLIGENT  
MONITORING OF  
ENERGY SYSTEMS IN  
COLOMBIAN NIZS**



# System



# Service or Data Processing Centre

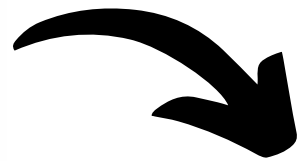




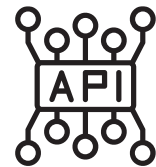
# Other projects



## Buses



Sensor technologies



Optimisation & AI

**TSIM**  
Transport System Intelligent Monitoring

Information

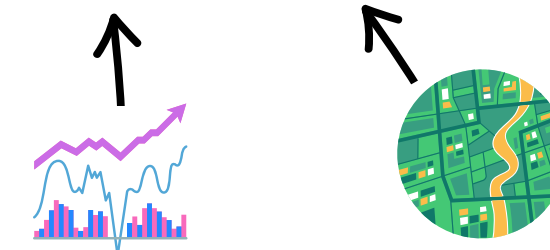
Predictions

Real Time Monitoring

Reports

Alerts

## Taxis





# Impacts at Different Levels

Academia



Industry



Schools



Government



Communities





# THANK YOU!



Scan here to contact



LED BY:



Prof. Dr. Ramón Fernando  
Colmenares-Quintero  
CEO & Founder



Engineering  
**Research**  
Institute



Science, Technology, Innovation, and Culture  
LATAM & European Network

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