



A European Union
Programme

SmartCitylabs
of Rome & Lazio

1st Webinar: Smart Cities and Blockchain Innovations

IUC Pilot Project Granada Competitive Fund

Thursday, 29th October 2020, 08:30 – 10:30 CET

EU - IUC

International Urban Cooperation
Smart City Labs of Rome and Lazio
Experiences with Blockchain in Rome

Gianluca Fabbri, PhD

Summary

- The Smart City Labs of Rome and Lazio
- The Cluster of Companies and Universities
- On Going Projects and Funding Request Activities
- Two Projects on Blockchain
- Conclusions

Smart City Labs of Rome and Lazio



Laboratories dedicated to research in the fields of Smart City and IoT, focused on implementation of hardware and software platforms for complex IoT systems, to support various vertical application scenarios.

Primary objectives:

- Implementation of joint R&D projects with highly innovative companies and research organisations.
- Organization of conferences, events and seminars on the topics of interest to facilitate building capacities.
- Enhancement of highly specialized human capital.
- International Service Platform to encourage the technological transfer of research results.
- Internationalization, dissemination, transfer and replication of projects results.
- Strategic alliances with international companies and universities.
- Exhibition showroom of prototypes developed in R&D projects.

Smart City Labs of Rome and Lazio: Main goals

SmartCitylabs of Rome & Lazio

Research &
Development

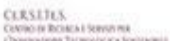
Technological
Transfer

Internationalization
Education

POSTGRADUATE
EXECUTIVE
MASTER'S
PROGRAMMES

Application Areas

- Smart City
- Smart Building & Smart Home
- Smart Mobility & Smart Grid
- Blockchain
- Smart Agriculture
- E-Health
- Smart Tourism



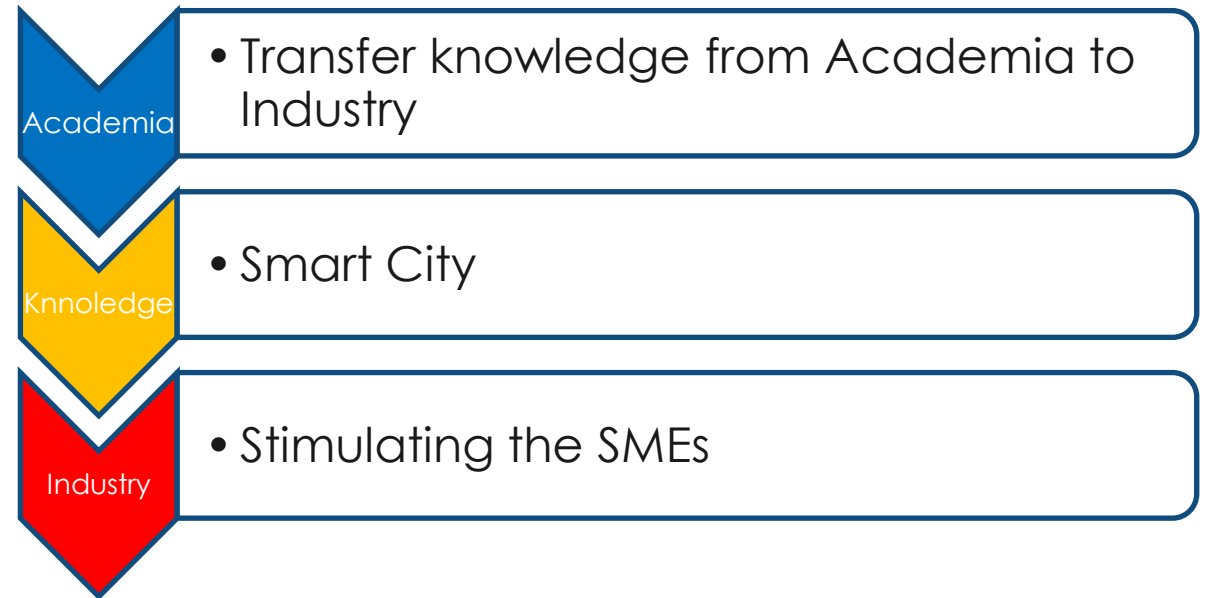
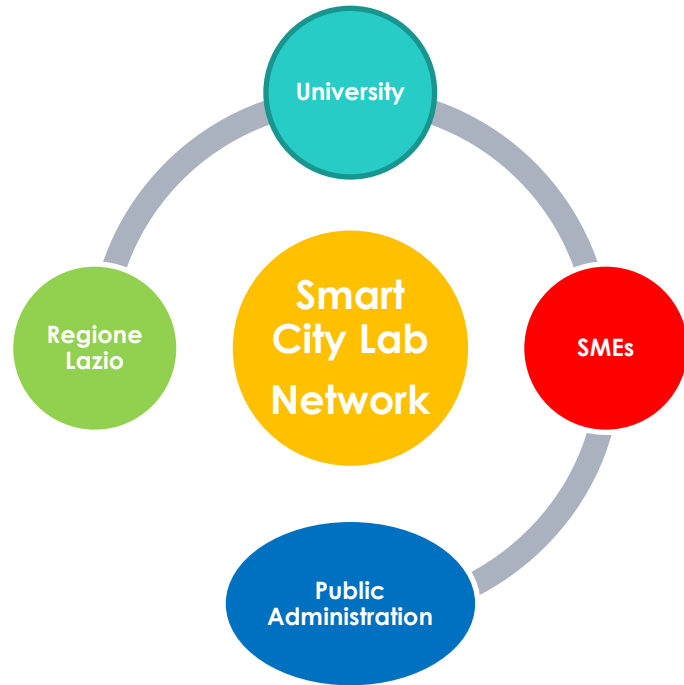
Smart City Labs: Funding Request Activities

- ➔ Preparation of project proposals for funding from the EU national and regional programs
- ➔ Innovation processes and technology transfer
- ➔ Construction of Public and Private Partnerships and Networks for complex collective R&D Projects
- ➔ Project Management and Coordination

You've Got Funding!



Technological Transfer and Exchange



The main aim is the **Transfer of Knowledge** from the academia to the industry, stimulating the Small and Medium Enterprises involved in the research sectors.



SMART TOURISM
&
CULTURE

LOGISTIC

SmartCitylabs
of Rome & Lazio

SMART
AGRICULTURE

EDUCATION
AND
COACHING

BLOCKCHAIN

SMART
CITY
LABs

e-HEALTH CARE



Visit of Business delegations to China

Thanks to the participation in the IUC Program several Memorandum of Understanding have been signed with Chinese prestigious partners to develop joint projects and to implement the platform.

Rome



The delegation of representatives of the Chinese partner cities during the visit to Rome on 18 September 2018 and 12 September 2019.

Yantai



Rome's Smart City Labs signed an MoU with Tencent Cloud Innovation Base in Yantai during the mission in China on the 20-25th November 2018.

Nanjing



In Nanjing an MoU has been signed with the Nanjing Jianye District information Center during the Techweek 2019 on the 23-29th June 2019.

Kunming



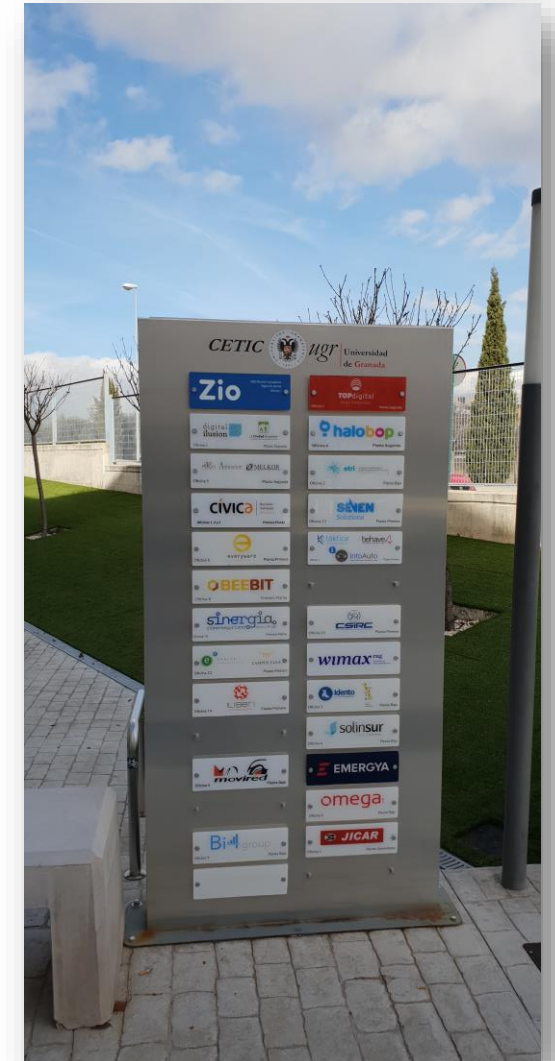
In Kunming an MoU has been signed with the Chenggong Information Technology Park during the mission in China on the 20-25th November 2018.

Liuzhou



MoU signed with the Liudong New Area of Liuzhou in the occasion of the Roundtable of Innovation in Rome on the 12th April 2019.

Visits of to Granada e Malaga



BLOCKCHAIN AND IOT

SYNERGIC USE OF BLOCKCHAIN ON OUR IoT PROJECTS

Using common blockchain protocol for safer data exchange
Facilitate communication between IoT objects connected

IDENTITY MANAGEMENT in the Internet of things

Management of the identity of things:
certification of supply chains also based on data coming from things (IoT)
End-to-end recognition of virtual or physical objects, (objects that manage transactions)
People can "be identified" thanks to objects



Certification



BLOCKCHAIN AND IOT

INTEGRATION WITH OTHER TECHNOLOGIES



Certification



AMPLIFICATION OF INNOVATIVE POTENTIAL FROM THE VIRTUOUS UNION OF TECHNOLOGIES

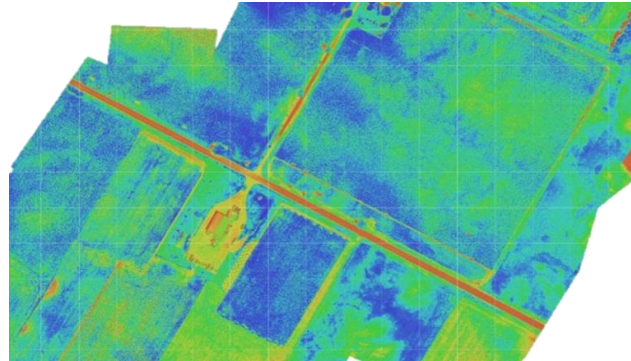
Healthcare

Democracy

Instant Insurance

Smart City

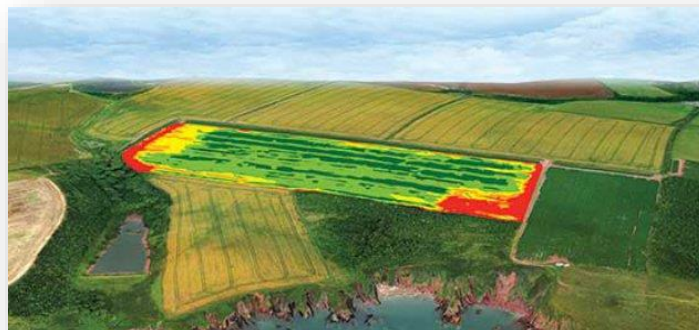
BLOCKCHAIN, CONCRETE APPLICATIONS: THE WINE VALUE CHAIN



The Lab is coordinating several projects focusing on Smart Agricultural Systems to be used for Precision Agriculture. 本实验室负责联系管理数个专注于智能农业系统的项目，用于精准农业。

These projects focus on the development of **an Innovative Integrated Platform for Precision Farming**.

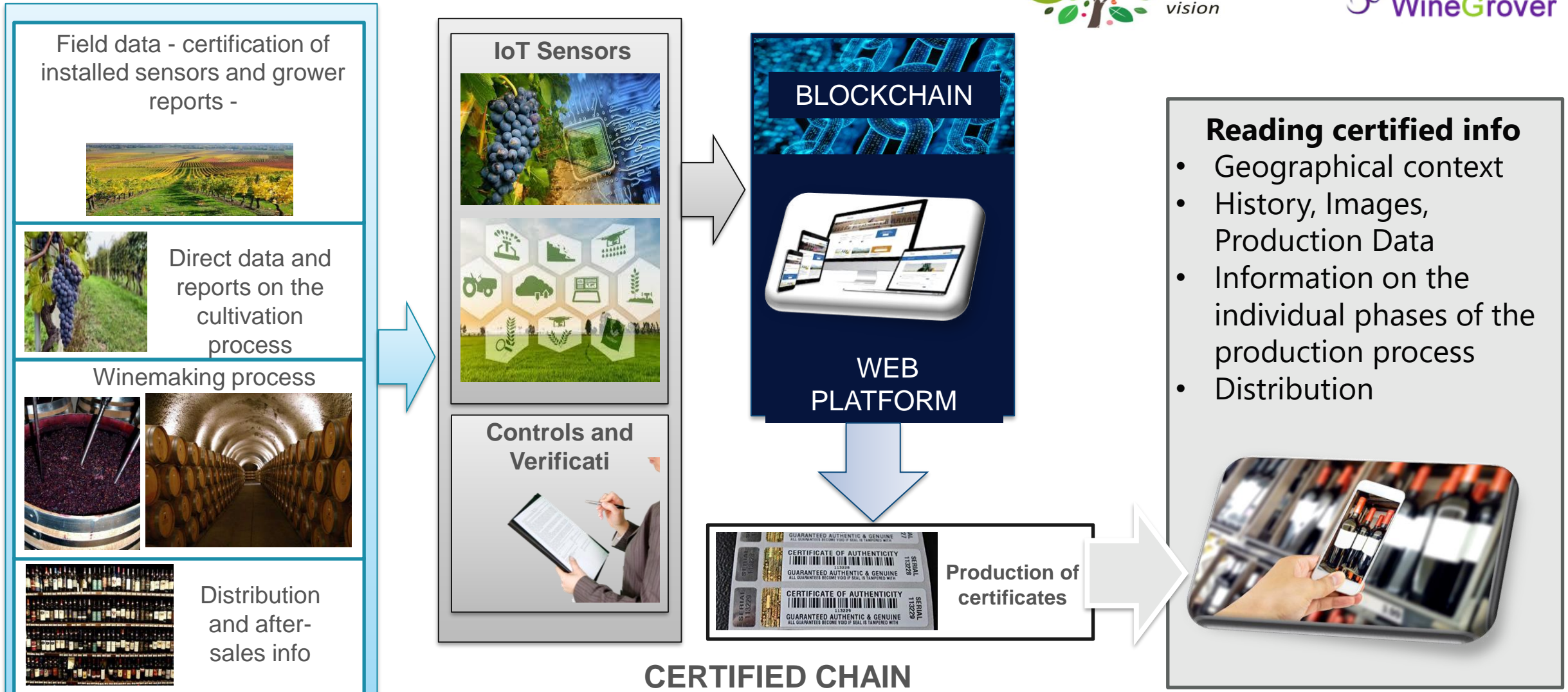
The system integrates innovative technologies like autonomous aerial and terrestrial drones platform, monitoring system and dedicated software and a multi sensors platform. 这些项目的重点是开发一个**创新的精密农业综合平台**。该系统集成了自主空中和地面无人机平台、监控系统、专用软件和多传感器平台等创新技术。



Partners



BLOCKCHAIN, CONCRETE APPLICATIONS: THE WINE VALUE CHAIN



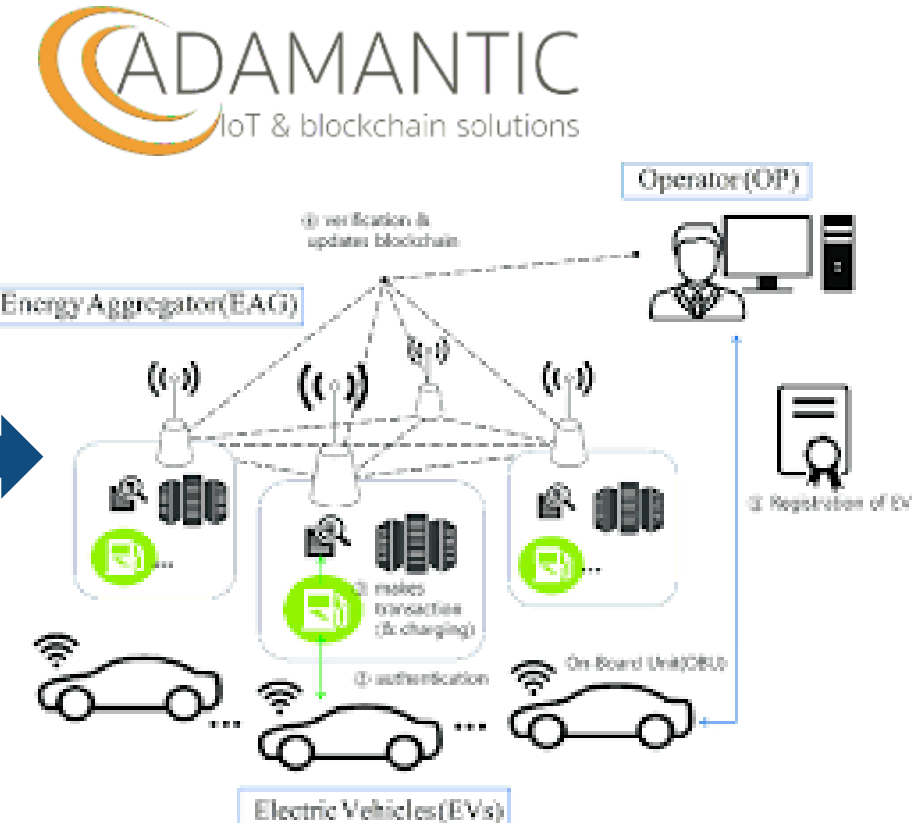
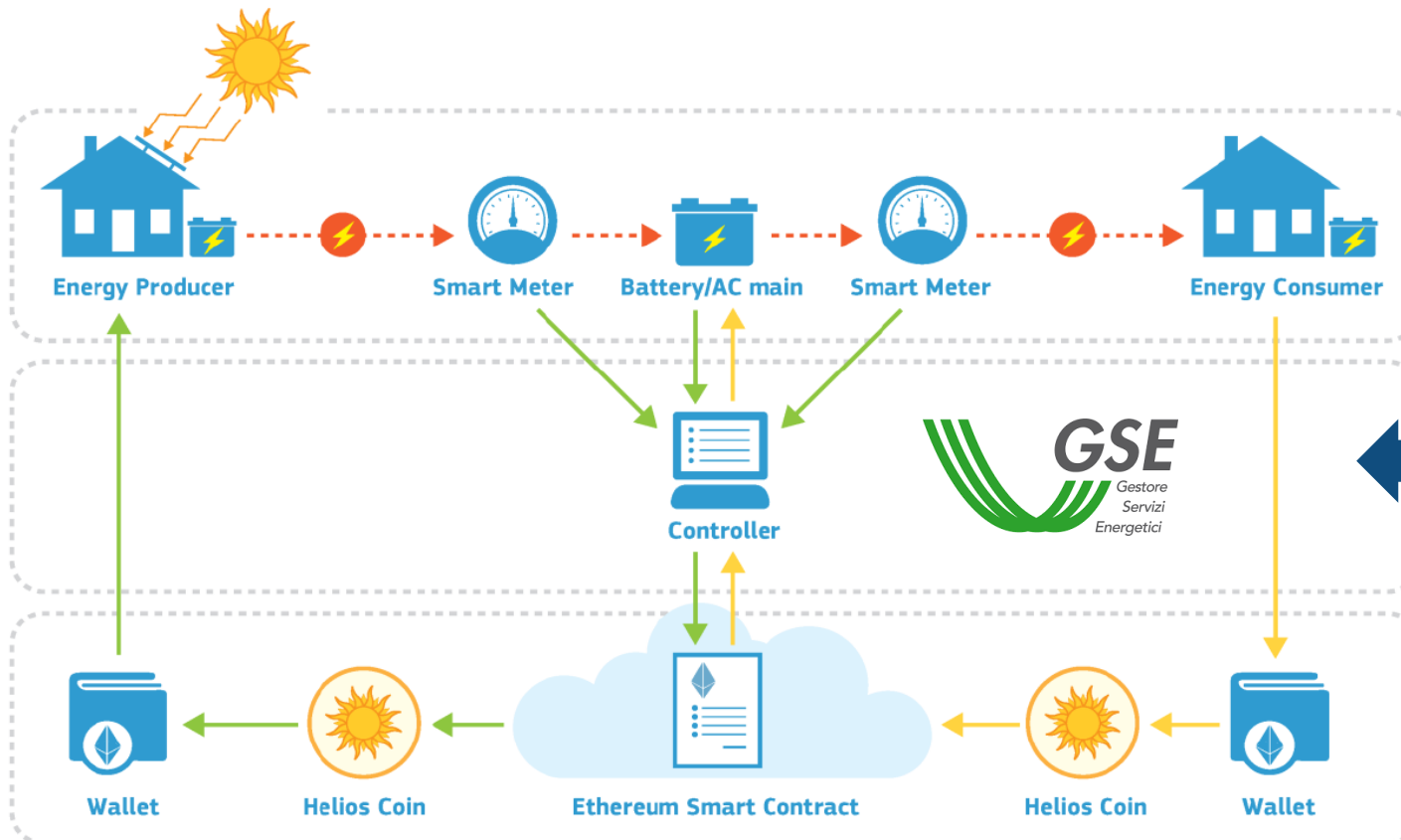
BLOCKCHAIN, CONCRETE APPLICATIONS: ENERGY COMMUNITIES

NATIONAL ENERGY SERVICE MANAGER

Realization of a proof of concept (POC) related to the application of Blockchain technology to the processes of the Italian national energy service manager "

Proof of concept 1: Simulation of energy communities

Proof of concept 2: Certification of the charging chain for e-vehicles and renewable energies



BLOCKCHAIN, CONCRETE APPLICATIONS: ENERGY COMMUNITIES

Advantages of the use of blockchain for energy communities

- Possibility to have a trusted and decentralised direct exchange between two parties.
- No intermediaries or third parties are needed in order to fulfil transactions.
- The data on the blockchain are public, easily verifiable by interested parties, consistent, and always available.
- Data are available, but the users remain pseudonymous, as for the transactions blockchain addresses and not personal data are used.
- Due to their decentralised nature and therefore lack of a central point of failure, blockchains are very resistant to denial of service attacks.
- Data on the blockchain are immutable, meaning that once inserted in the blockchain it cannot be altered, providing therefore a reliable point of reference.
- By having these features, blockchain provides a trusted technology that can be used as an Information and Communication Technology (ICT) backbone for an open energy market.

Challenges: To what extent can blockchains influence the energy transition of cities? How could this technology help cities and their inhabitants become energy producers and use all or part of the energy produced for their own consumption?

1 HOW IT WORKS

BLOCKCHAIN enables the implementation of **SMART CONTRACTS**, self-executing programmes which can be used to better manage systems and integrate higher shares of renewables through automation.



Smart contracts are set to self-execute when specific conditions are met, e.g. when peers trade electricity for payment.

2 POTENTIAL BENEFITS OF BLOCKCHAIN

- Reduced transaction costs
- Increased transparency
- Increased security
- Increased automation via smart contracts
- Increased participation by new/more actors via decentralisation

3 KEY APPLICATIONS TO INTEGRATE RENEWABLES

- Peer to peer power trade
- Grid management and system operation
- Financing renewable energy development
- Management of renewable energy certificates
- Electric mobility
- Others



TECHNICAL REQUIREMENTS



Hardware:

- Smart grid, smart metering
- Smart phones or computers

Software:

- Blockchain support software
- Smart contracts and cloud platforms

Communication protocols:

- Scale protocols to handle increased transaction loads while maintaining security and increasing speeds
- Common interoperable standards along with data storage and identity, smart contracts

POLICIES NEEDED



Strategic policies could include:

- Regulation and supervisory role for promoting safe, efficient and cost-effective electricity transmission and exchange
- Regulation for the interaction of new blockchain-based trading and evolution of existing electricity trading regulations
- Promotion of decentralised generation

REGULATORY REQUIREMENTS



Market regulations that enable electricity exchange between consumers and prosumers (for P2P trading applications), and between prosumers and system operators (for grid transactions)

Retail market:

- Customer and producer support and empowerment
- Understanding of the need for open market dynamics
- Certainty in the ability of prosumers to freely sell power generated from residential distributed energy resources to other grid-connected consumers

Distribution:

- Incentivise DSOs to modify their business models and take up the role of a facilitator and supervisor
- Organise payment rules for use of the DSO electricity grid and potentially also the use of the TSO grid if exchange over multiple DSOs is needed

STAKEHOLDER ROLES AND RESPONSIBILITIES



Electricity market participants:

- Existing roles in the power sector might shift substantially: retailers may face reduced need if all data (and electricity) is exchanged directly between the electricity producer and the consumer, for example
- Organise rules to balance consumption and production, and determine consequences if balance is not achieved;
- Empower consumers through P2P trading and transparent, decentralised information sharing

INNOVATION



DIMENSIONS



● ENABLING TECHNOLOGIES

1	Utility-scale batteries
2	Behind-the-meter batteries
3	Electric-vehicle smart charging
4	Renewable power-to-heat
5	Renewable power-to-hydrogen
6	Internet of things
7	Artificial intelligence and big data
8	Blockchain
9	Renewable mini-grids
10	Supergrids
11	Flexibility in conventional power plants

● BUSINESS MODELS

12	Aggregators
13	Peer-to-peer electricity trading
14	Energy-as-a-service
15	Community-ownership models
16	Pay-as-you-go models

● MARKET DESIGN

17	Increasing time granularity in electricity markets
18	Increasing space granularity in electricity markets
19	Innovative ancillary services
20	Re-designing capacity markets
21	Regional markets
22	Time-of-use tariffs
23	Market integration of distributed energy resources
24	Net billing schemes

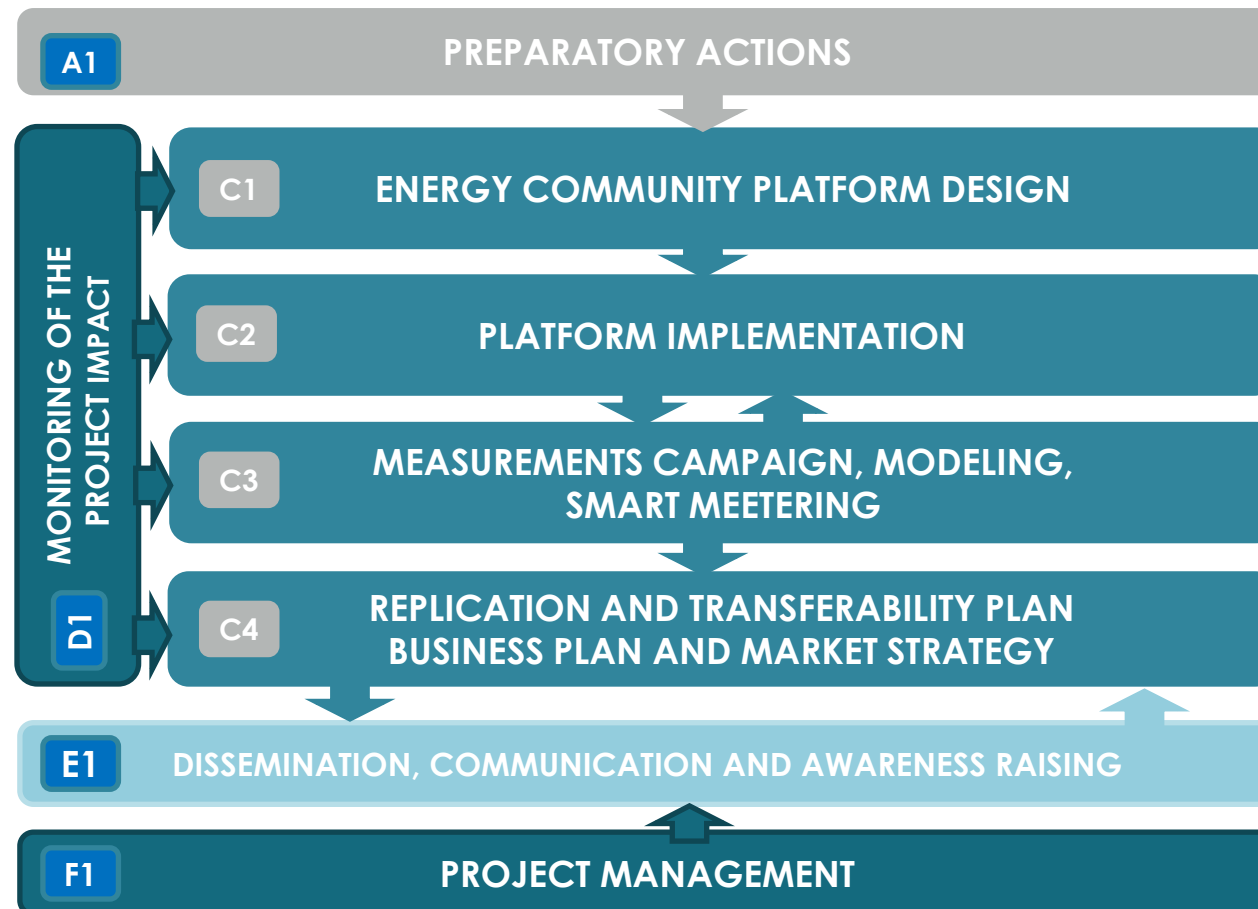
● SYSTEM OPERATION

25	Future role of distribution system operators
26	Co-operation between transmission and distribution system operators
27	Advanced forecasting of variable renewable power generation
28	Innovative operation of pumped hydropower storage
29	Virtual power lines
30	Dynamic line rating



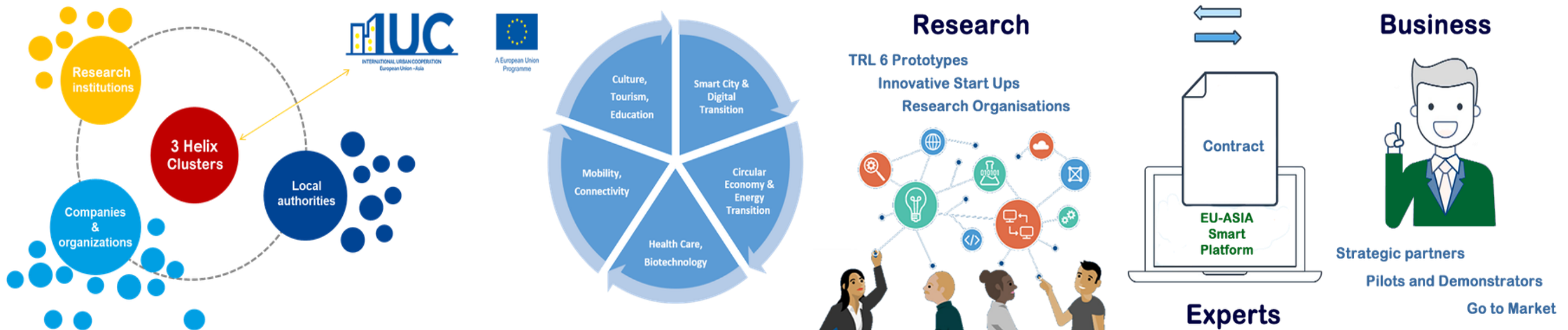
BLOCKCHAIN: THE BLOCKCHAIN4ENERGY PROJECT

MAIN PROJECT ACTIONS



Europe-ASIA Smart Platform: How it works

- The EUROPE-ASIA Smart Platform is a pilot project implemented as result of the actions carried out by the Smart City Lab of Rome in the framework of the IUC project.
- Cooperation takes place with the Triple Helix approach in the fields identified by 5 main Thematic Clusters.



- The platform allows to identify potential candidate applications for technology transfer in target business fields and supporting scientific and technological cooperation among researchers, small and medium enterprises, start ups, entrepreneurs, investors.
- The platform is also used to contact identified companies in order to validate the foreseen interest.
- This step is preceded by a validation phase through experts who help better articulate the potential benefit of the technology placed in a new context.

Europe-ASIA Smart Platform: Experts



Expert name: **Eduardo De Francesco**
Gender: **Male**
Expertise Area: **Logistic and Telecommunication**
Research Orientation: **Robots and Precision Agriculture**
Country: **Italy**
Position: **CTO Setel**

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Expert name: **Bernardo Puccetti**
Gender: **Male**
Expertise Area: **Electronic Engineering**
Research Orientation: **e-Health**
Country: **Italy**
Position: **CTO Healthia**

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Expert name: **Gianluca Fabbri**
Gender: **Male**
Expertise Area: **Electrical Engineer**
Research Orientation: **IoT and Technological Transfer**
Country: **Italy**
Position: **Director IoT Smart Lab**

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Expert name: **Oscar Prat van Thiel**
Gender: **Male**
Expertise Area: **Innovation**
Research Orientation: **Technological Transfer**
Country: **China**
Position: **Director Innovation Fair Nanjing**

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Expert name: **Jens Bley**
Gender: **Male**
Expertise Area: **Smart City**
Research Orientation: **Smart City Services, e-Culture, m-Tourism**
Country: **Germany**
Position: **Professor eCultureLab**

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Expert name: **Francesca Cocco**
Gender: **Female**
Expertise Area: **Technological Transfer and Innovation**
Research Orientation: **Open Innovation**
Country: **Italy**
Position: **R&D Development k4business**

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Expert name: **Elisa**
Gender: **Female**
Expertise Area: **Tourism**
Research Orientation: **Education**
Country: **Italy**
Position: **CEO Italian Life Style**

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Expert name: **Massimo Antonucci**
Gender: **Male**
Expertise Area: **Business Advisor**
Research Orientation: **Innovation and Technology Transfer**
Country: **Italy**
Position: **CEO Coach your Start up**

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Expert name: **Domenico Barra**
Gender: **Male**
Expertise Area: **IoT Platforms**
Research Orientation: **Blockchain**
Country: **Italy**
Position: **CTO Adamantic**

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Expert name: **Francisco Luis Benitez**
Gender: **Male**
Expertise Area: **Blockchain and Smart Cities**
Research Orientation: **Blockchain**
Country: **Spain**
Position: **Researcher at MediaLab University of Granada**

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Expert name: **Daniel González Bootello**
Gender: **Male**
Expertise Area: **Smart City**
Research Orientation: **Technological Transfer, Innovation, Clusters Alliances**
Country: **Spain**
Position: **General Director Smart City Cluster**

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Expert name: **Alfredo Adamo**
Gender: **Male**
Expertise Area: **Open Innovation, Start ups**
Research Orientation: **Cutting edge technologies, Disruptive business**
Country: **Italy**
Position: **CEO Alan Advantage**

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Europe-ASIA Smart Platform: Business and R&D Projects

PUBLISH YOUR DEMAND



Describe your project requirements. The projects will be validated by experts and published in the platform.

FIND YOUR PARTNER



The platform will allow to get in contact with investors and partners and identified companies.

DEVELOP YOUR PROJECT



Transfer the results of your project and develop joint pilot or demonstrator activities.

Smart Agriculture



Project name: **Agridrone Vision Project**

Organisation type: **SME**

Business Domain: **Precision Agriculture**

Technological Readiness Level: 6



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[Click here to see the proposal](#)

Smart Health



Project name: **Mammowave**

Organisation type: **SME**

Business Domain: **Digital Health**

Technological Readiness Level: 7



Explore

[Click here to see the proposal](#)

Conclusion: Fields of Cooperation



Develop joint R&D Research project together



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