Boosting Circular Systemic Solutions through
Virtual Regional Circular Economy Space

Materializing circular water use, fostering awareness in resource efficiency, and delivering innovative solutions for a Water-Smart Society

AquaSPICE Info-Day Event, Chania

Chania, Greece | 02/07/2024

Prof. Francesco Fatone | Università Politecnica delle Marche
Assoc. Prof. George Arampatzis | Technical University of Crete (TUC)

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them

CSSBoost At a Glance

Boosting Circular Systemic Solutions through Virtual Regional Circular Economy Spaces

Topic CL6-2023-CircBio-02-1 – Circular Cities and Regions Initiative (CCRI)'s circular systemic solutions

Destination Circular economy and bioeconomy sectors

Coordinated by Technical University of Crete, Assoc. Prof. George Arampatzis

21 Partners

8 Countries

5 Case Studies

11,876,438€

3.5 years

Started June 2024

CCRI

About the Circular Cities and Regions Initiatives

- **An innovative collaboration and support scheme of the European Commission**, launched by DG Research & Innovation
- **Part of the EU Circular Economy Action Plan 2020**, and contributing to the policy objectives of the EU Green Deal as well as the EU Bioeconomy Strategy
- Supported by the EU's R&I funding programme (Horizon 2020 and Horizon Europe): **more than €250 million earmarked for CCRI**
- Aims to support the implementation of **circular systemic solutions** in EU cities and regions, as well as the **development of new circular business and governance models**.

What the CCRI is about?

- Identifying drivers & barriers to territorial innovation
- Encouraging on-the-ground experimentation, supporting pilots and demonstrations
- Highlighting promising (replicable) solutions, suggesting practical steps forward, preparing for full-scale territorial deployment

►► Structuring and maturing cities' circular projects to a stage where they become scalable, bankable and therefore, truly impactful

The Need

Challenges and Motivation

- The needs to boost and accelerate CE transition
  - Sustain non-replaceable natural resources
  - Climate change
  - Promote lifestyle change towards resource conservation
- The status
  - "There is only limited evidence that the CE action plans had influenced circular-economy activities in the member states" (*The European Council of Auditors, 2023)*
- The main reason
  - Circular business models usually take place on a micro-level (an individual firm)
  - Not accounting the systemic implementation of CE principles that often span across firms and other stakeholders in a city or region or groups

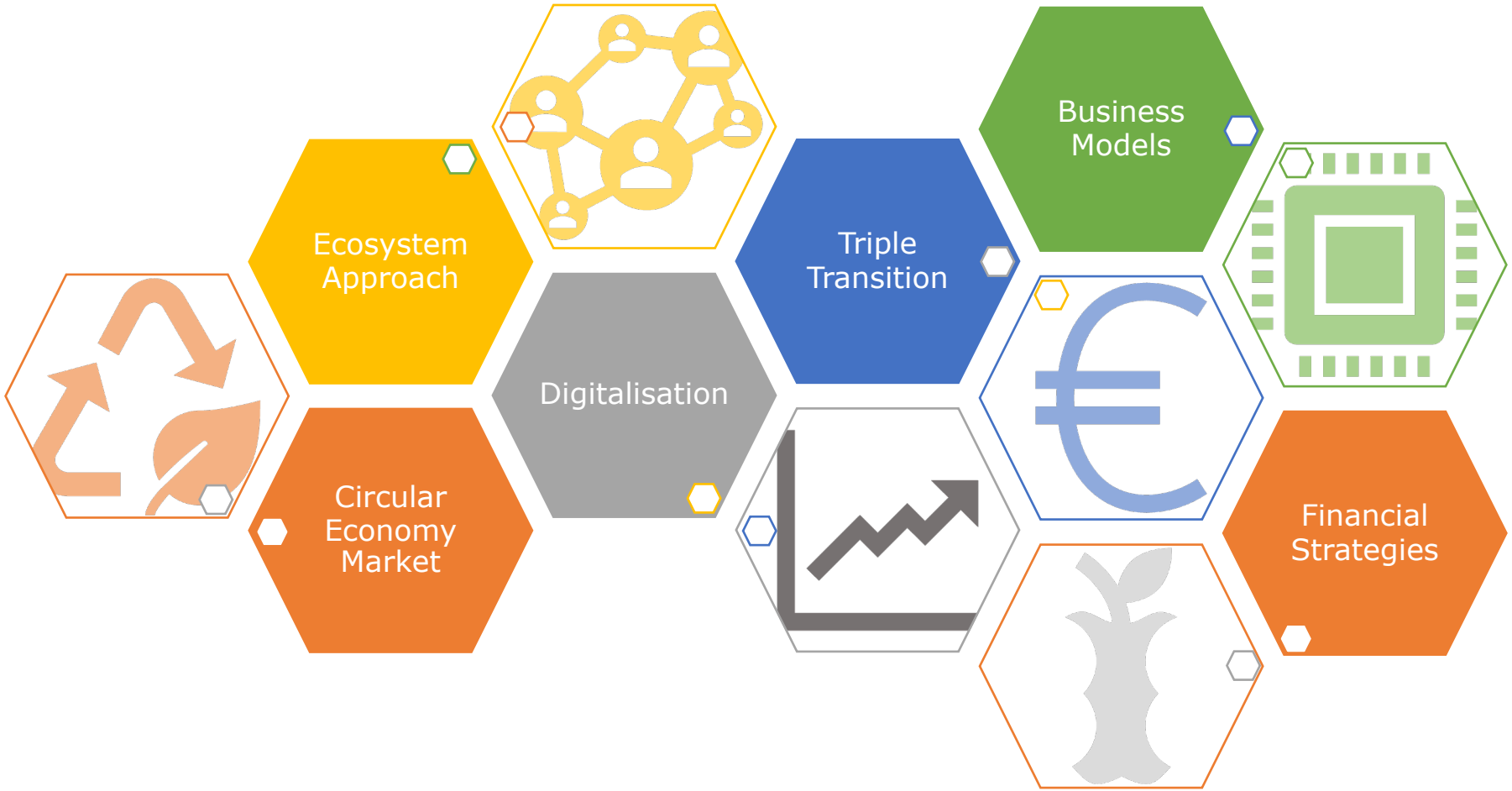
- The solution
  - The Circular Systemic Solution (CSS) concept (*Projects applying innovative circular models involving different actors, value-chains, levels of government & governance*)
- The barriers
  - Small-scale solutions are more applicable and controllable
  - Large-scale solutions are vulnerable to systemic barriers and organisational and governance inefficiencies of CE
  - CSSs are susceptible to changes in social and economic conditions

Need to Accelerate CE transition
by Boosting Circular Systemic Solutions in Cities, Regions or their Groupings

Strategic CSSBoost Objectives

- Maximise the adoption and impact of any CSS, by applying it within an enabling integrated environment
- Extend this environment to energise and manage the entire CE transition in cities and regions
- Maximise CSS sustainability and growth along its entire lifecycle
- Enable knowledge exchange, CE relations and interoperability between different regions/cities
- Target the advancement of CE in specific EU regions and promote CE methods and mind-set

EU Strategic Pillars relevant to CSSBoost



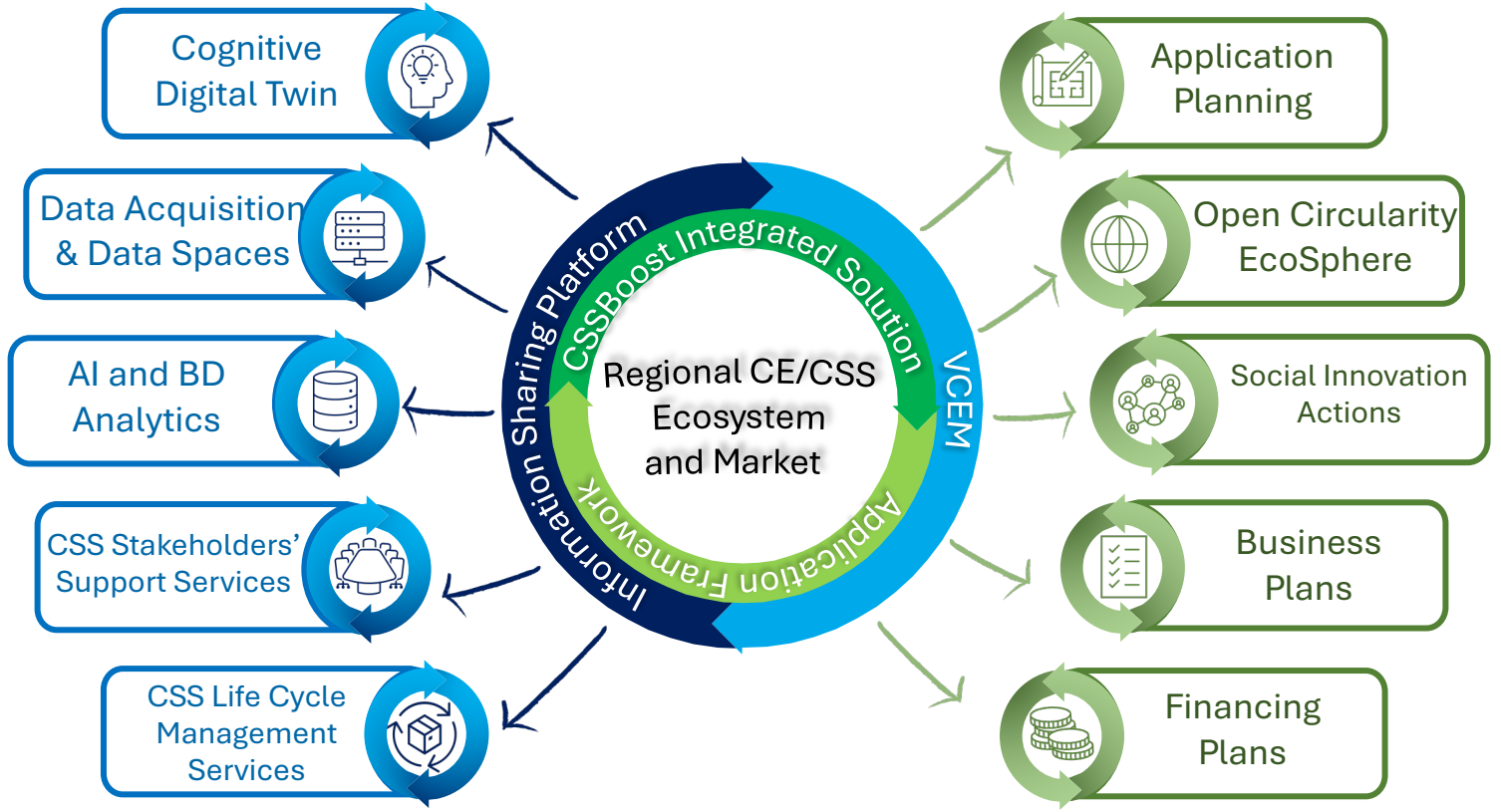
The Solution

The Enabling Integrated Environment

CSS Booster

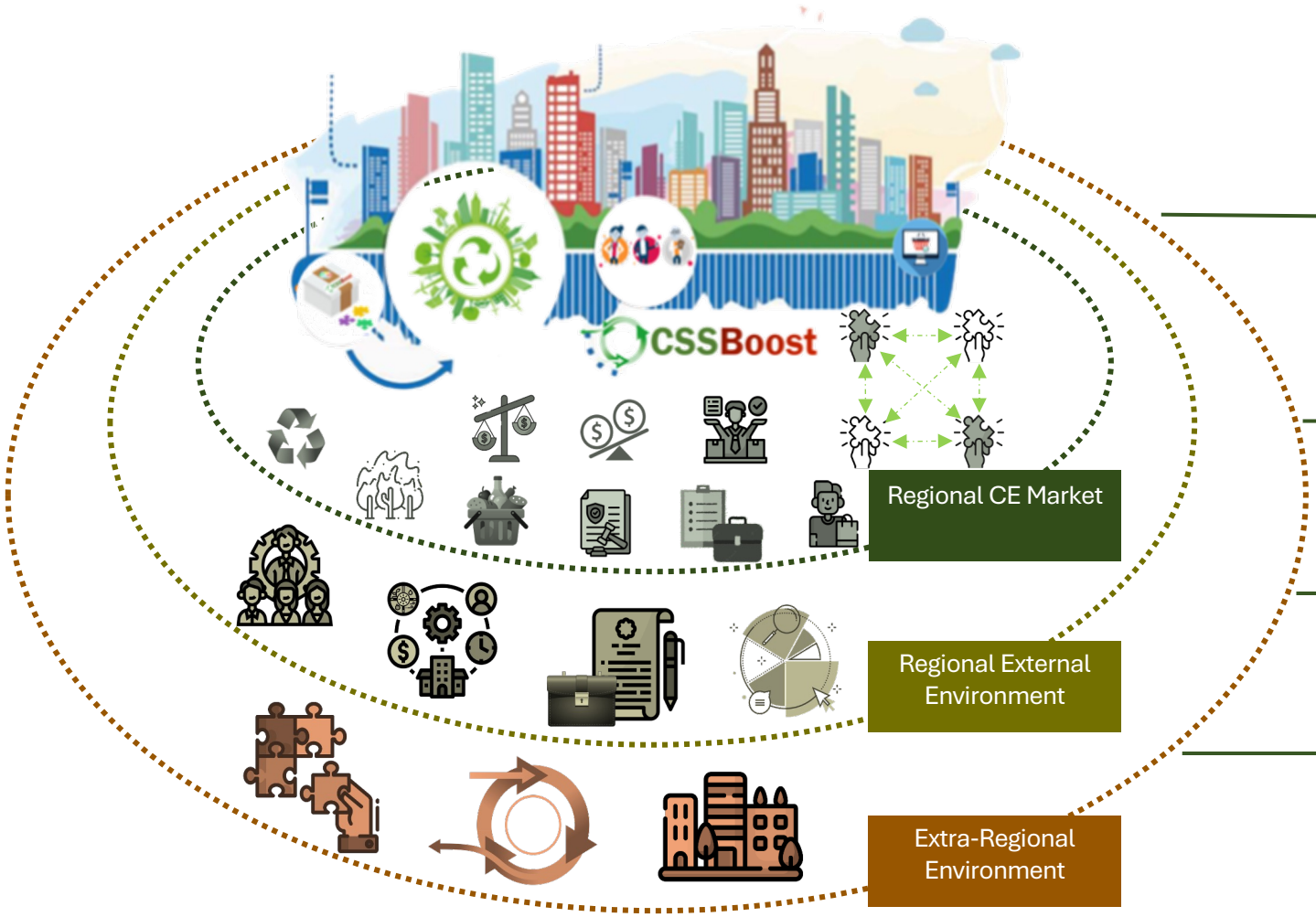
- Open (physical) space of city, regional or multi-regional scope based on an ecosystem approach
  - CE Market
  - Internal Environment
  - External Environment
- Virtualisation
  - Dynamic monitoring
  - Digital Twining
- Information Sharing Platform
  - Visualising
  - Understanding
  - Supporting

Cyber-Physical System



The Concepts

CE/CSS Ecosystem and Market



STAKEHOLDERS & ACTORS

Utilities, R&D, SMEs, Consultants, Processors, Producers, Distributors, Customers, Regulators, Admins, Investors, Env. agencies, Citizens

RESOURCES

Waste sources & streams, Feedstock, Technologies, Solutions, Products, Demand, Substructures

CONDITIONS

Market conditions, Promotion, Awareness & Attitudes, Regulations, Climate conditions

SECTORS

Industrial development, Regional economy, Governance, Regional society, Education

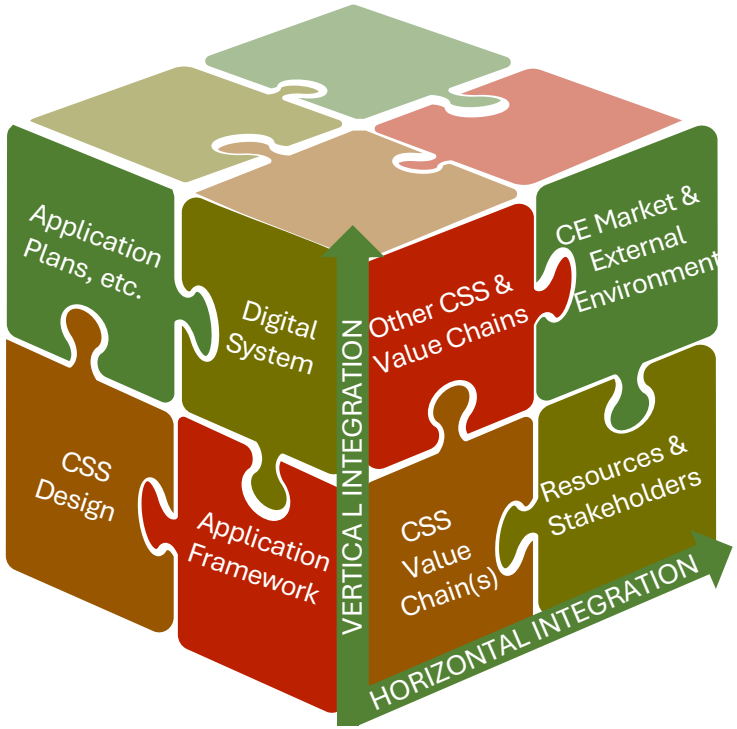
CSSBoost Integrated Solution

A) Integrated CSSBoost solution package

Successful CSS **application** by optimal CSS **design, virtualisation,** and application **planning**

B) Lifecycle (self-) managed CSS

Dynamic CSS operational lifecycle **management** for sustainability, **adaptation** & **upscaling**



C) Lifecycle management of multiple CSS

Dynamic CSS operational lifecycle management encompassing **multiple existing or new CSSs**

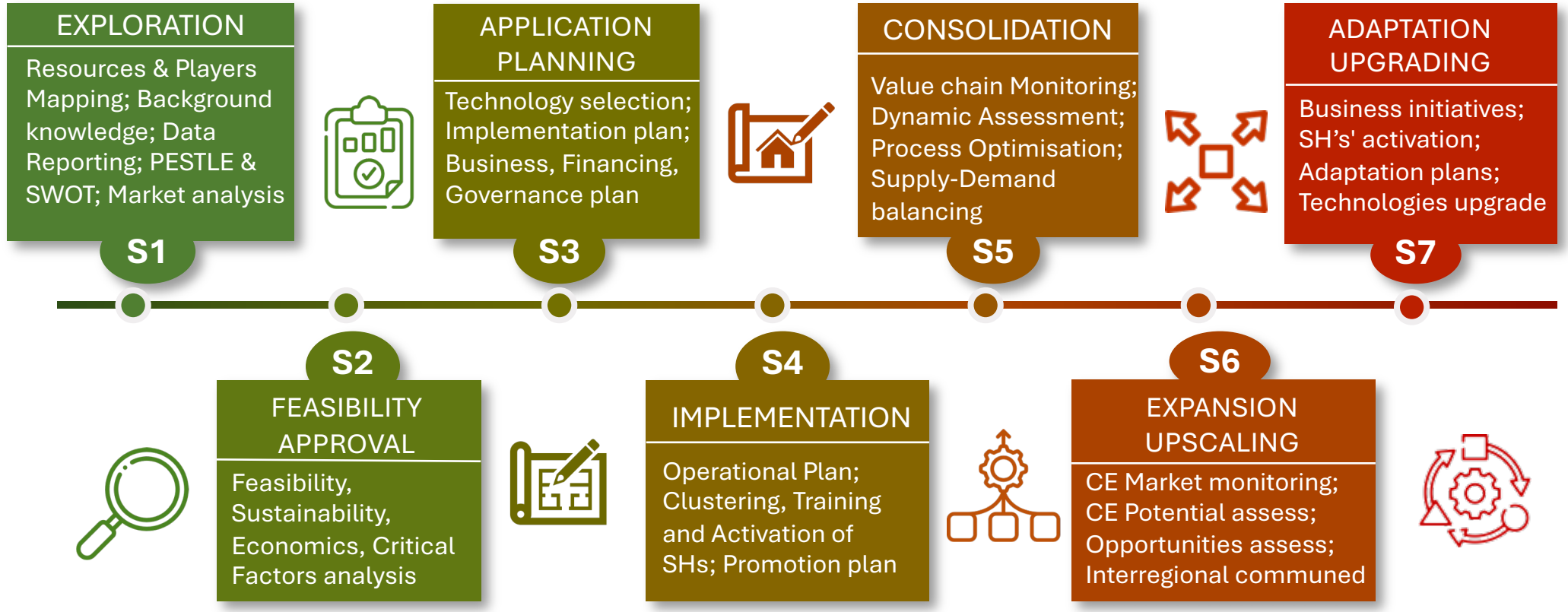
D) Regional CE transition management & enabler

Dynamic CE transition **assessment/ management**, **exploitation** of CE potential and market growth

E) Regional CE transition pathway planning

Initiate regional CE strategic planning, **develop**, **monitor** and **support** regional CE pathway

Lifecycle of CSSBost Solution



The Offerings

Pilot Areas


Pilot 3 – North Black Forest, Germany
Pilot 2 – Marche, Italy
Pilot 4 – Lisbon, Portugal
Pilot 1 – Crete, Greece
Pilot 5 – Interregional, Multi-National

Demonstrators

No	Region	Scope / Sectors	Partners	Value Chains
1	Crete, Greece	Agricultural, Livestock and Food Processing By-Products Valorisation CSS	**MACC**, CRETE, HMU, TUC	- Fertiliser and materials for soil improvement produced using biomass from livestock production - New types of plant bio-stimulants - More nutritious (low glycemic index) versions of bread and other bakery products
2	Marche, Italy	Water Reuse and Nutrients Recovery CSS	**UNIVPM**, UVIC, CIIP	- Water for irrigation and nature restoration - Nutrients for agriculture
3	North Black Forest, Germany	Conventional Plastics and Bioplastics Recycling CSS	**CAS**, MAG, TZHORB, WFG, BWCOM, KRUM	- Conventional plastics - Bioplastics
4	Lisbon, Portugal	Public Transport Vehicle Recycling and Valorisation CSS	**PARTICLE**, CARRIS, MOTON	- Use of recyclable materials from public transport vehicles - Material recovery at vehicle end-of-life disposal
5		Multi-regional Multi-National Value Chain CSS	**UVIC**, All Pilots leaders	- All above

The Marche Pilot

Thank You!

George Arampatzis
garampatzis@tuc.gr
Technical University of Crete

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them