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Quintuple Helix and Digital Innovation Ecosystem for the transition towards the Circular Economy

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UNIVERSITÀ
DEL SALENTO

LABORATORIO DI INGEGNERIA
ECONOMICO-GESTIONALE
DIPARTIMENTO DI INGEGNERIA DELL'INNOVAZIONE

Interreg
Greece-Italy
European Regional Development Fund



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PROMOTING CIRCULAR ECONOMY INVESTMENTS
AND POLICIES IN THE CIRCULAR ECONOMY
OF GREECE - ITALY

- ☐ Introduction
- ☐ Circular Economy & SDGs
- ☐ Innovation Ecosystems and Quintuple Helix Model
- ☐ Digital Innovation Ecosystems for the Circular Economy
- ☐ Circle-In Project

The debate on **Circular Economy** continues to be **fluorescent and populated by different perspectives** of studies aimed to deepen **meaning, dynamics and implications** of circularity at level of single **companies, industries, public organizations, urban areas and territories**.

(Cappellaro et al., 2019; Urbinati, et al., 2017; Innella et al., 2017; Ghisellini, et al., 2016; Mylan et al., 2016)

As a branch of **sustainability science** aimed to **reduce environmental impacts** and **promote sustainable** patterns of **development**, **Circular Economy** recalls, for its conception and execution, the contribution of a **plurality of stakeholders and shared values** (Miliute-Plepiene & Plepys, 2015; Schneider, 2015; Haas et al., 2015).

Despite the topic of innovation results to be intrinsically linked to the paradigm of Circular Economy, very few studies have explored its meaning and dynamic in the perspective of the **innovation ecosystems** and it is necessary to deepen how **digital platforms** can support the creation of a **circular economy innovation ecosystem**.

Circular Economy and SDGs



As a promising source of solutions at the challenges associated to the **sustainable development goals** identified by the United Nations (Geissdoerfer et al., 2018), Circular Economy is based on the assumption that **products and resources** continue to circulate in closed loops by minimizing waste, emission, and costs
(Ellen MacArthur Foundation, 2013; Ranta, et al., 2018).



Moving to a truly circular economy can help bring **all** the global goals to life, in particular:



Find out more about the SDGs & the campaign to make Europe sustainable for all
makeeurope sustainableforall.org



Stakeholders' role for Circular Economy

As result of the application of **Circular Economy principles** into the functioning of a business model, it requires to reserve a particular attention at some sustainable issues such as the **sustainable nature of value**, a **long term perspective** and the **growing role of stakeholders** (Urbinati, et al., 2017; Geissdoerfer et al., 2018).



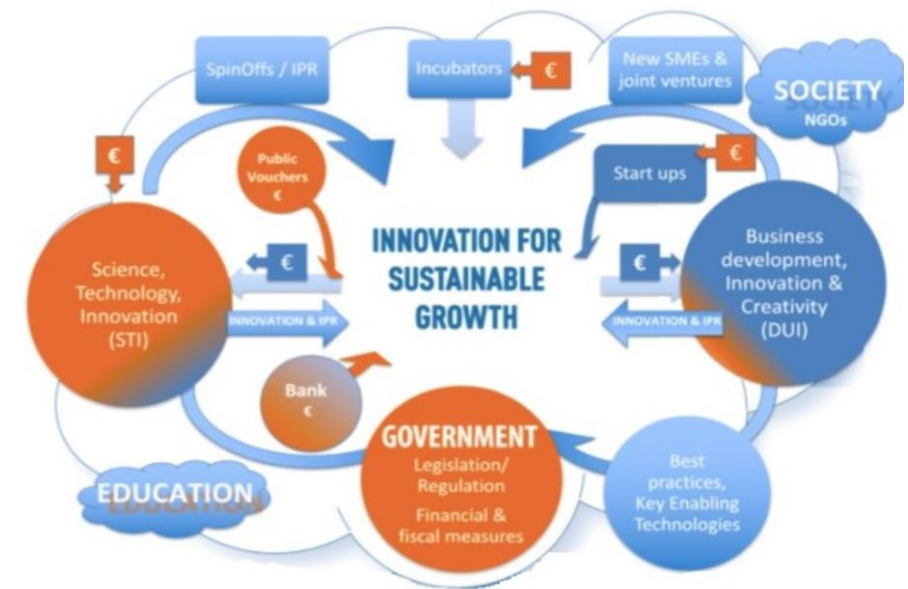
The **involvement of stakeholders** within the organizational ecosystem has been identified as **crucial for the successful implementation of a circular business model** as well as for the **full transition of the economic system**.

(Lewandowski, 2016; Antikainen and Valkokari, 2016; Nußholz, 2018).

Stakeholders' role for Circular Economy

The premises at the basis of the systemic view on innovation ecosystem is that **innovation is not more a linear but a systemic process** that grows within a network of inter-organizational relationships (Zajac and Olsen, 1993; Powell et al., 1996) able to promote the **interrelation and integration of different knowledge sources and providers** (Romano, et al., 2014).

Innovation ecosystems are **institutional infrastructures** supporting networking and collaboration among a plurality of stakeholders by activating virtuous and knowledge-intensive flows of knowledge (Asheim and Gertler, 2005; Romano et al., 2014), with different contribution shaping from the **regional development** to the **open innovation** (Dedehayir, et al., 2018).



Innovation Ecosystems for Circular Economy

A **sustainable innovation ecosystem** can be defined as a **creative environment**, where it is possible to integrate global and local processes of **knowledge creation, knowledge diffusion and knowledge absorption**.

A **sustainable innovation ecosystem** is relevant context to booster the emergence of **innovative entrepreneurship**, which is the source of competitive advantage for the smart and sustainable growth of regions, organizations and individuals.

As an **institutional infrastructure** operating on a specific territory, the sustainable innovation ecosystems represent the local **environments more suitable for public policies and instruments** aimed to develop and diffuse innovative entrepreneurship.

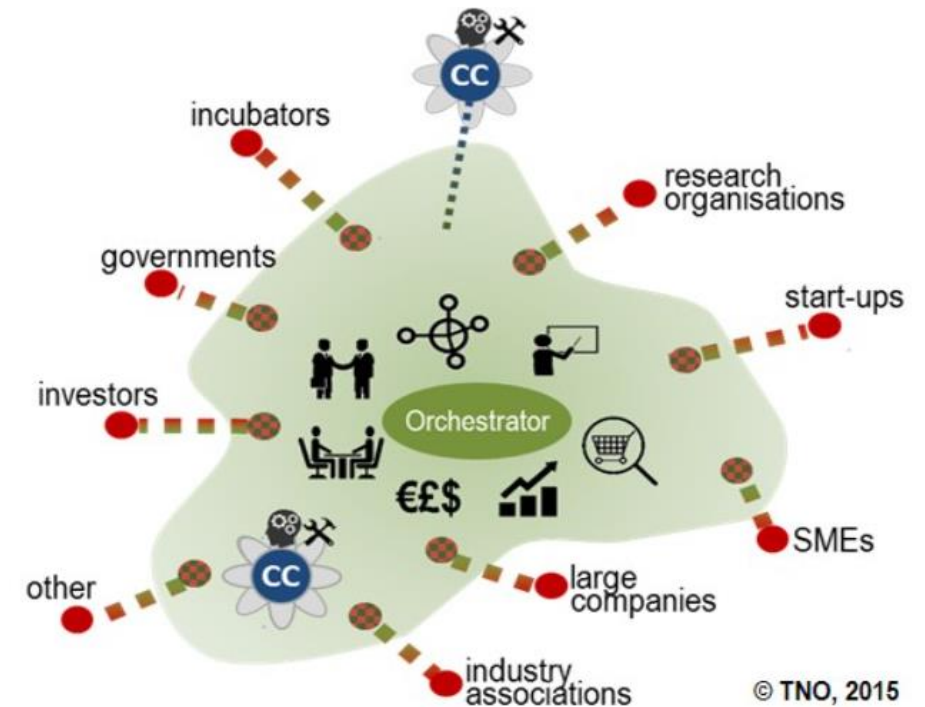
(Asheim and Gertler, 2005; Romano et al. 2013)

About the Innovation Ecosystems

Despite this, the full comprehension of the **role of stakeholders** for the successful implementation of a Circular Economy strategy is still under-research and calls for more research.

And it is necessary to understand which are the mechanisms more suitable for their **active involvement** as well as to explore the role and contribution offered by **digital platforms** in enabling the creation of an **innovation ecosystem** focused on circular economy.

(Del Vecchio, et al., 2020)



From Triple to Quintuple Helix

The shift from the Value Network to the Triple Helix model points for a **creative knowledge environment** where processes of creation and dissemination of knowledge can be integrated through a clear focus on the actors.

(Hemlin et al., 2004; Etzkowitz, et al. 2004)

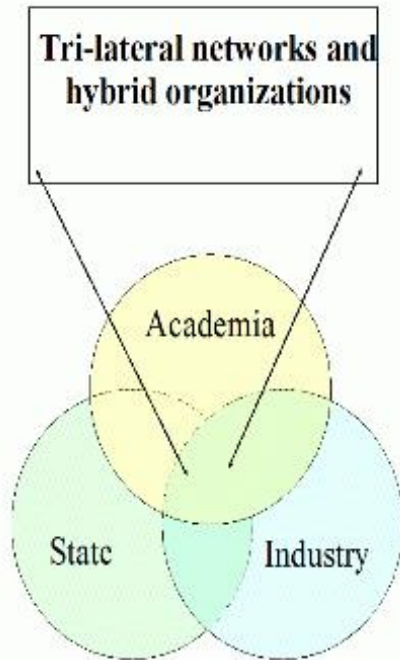
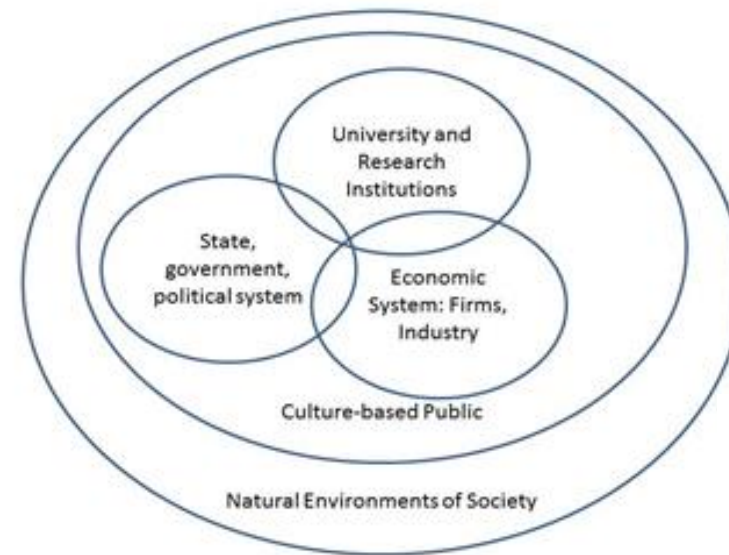


Figure 3
 The Triple Helix Model of University-Industry-Government relations

Etzkowitz, 2000, etc.

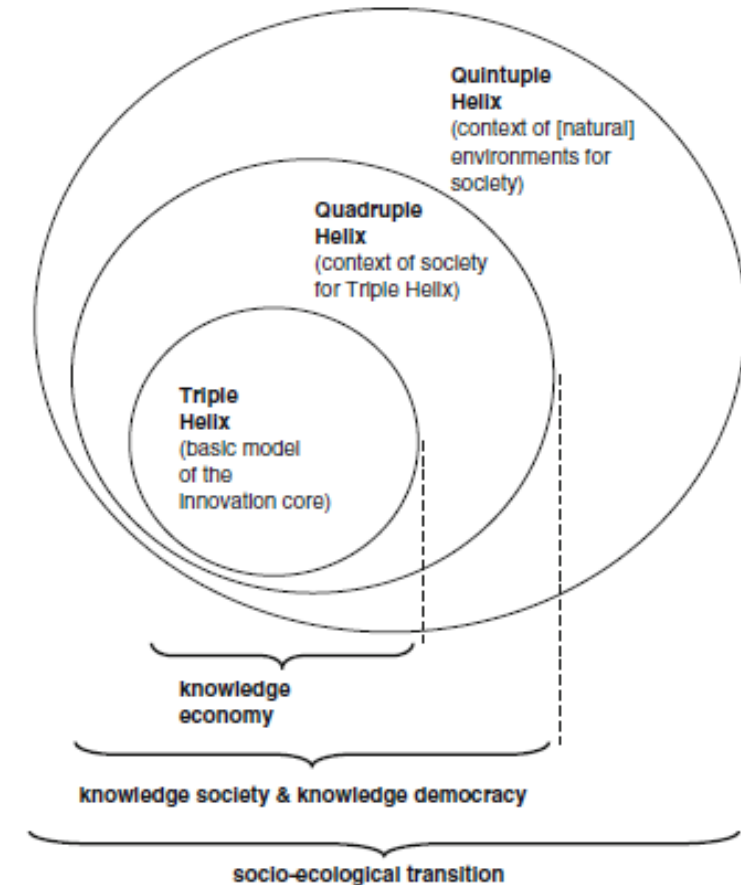


Carayannis & Campbell, 2009

From Triple to Quintuple Helix

Quintuple Helix results to be a recognized framework for mapping and managing the dynamics undertaken in the ecosystems by a community of **knowledgeable stakeholders** belonging to **governments, academia, industries, media based and culture based public**, and embedded in a **natural environmental and sustainability context**

(Grundel and Dahlström, 2016; Romano et al., 2014; Carayannis and Campbell, 2011, 2009).



A systemic view for Innovation

According to the “**structuralist-evolutionary model**”, based on the Schumpeterian research streams (Arthur, 2009, 1999; Lypsey, et al., 1998; Schumpeter, 1934), the economy can be conceived as an expression of the **Key Enabling Technologies (KETs)**.

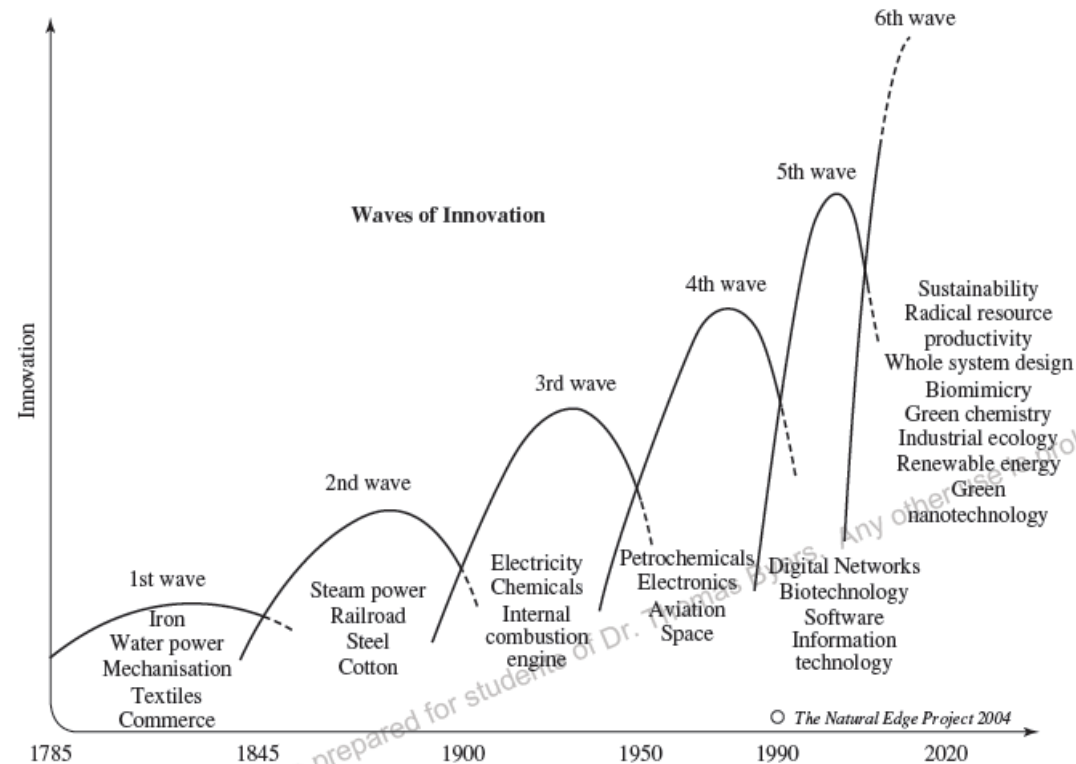


FIGURE 1.5 Waves of innovation throughout history.

Digital Technologies for Innovation Ecosystems

As argued by Hedberg et al., (2019) in a discussion paper on Circular Economy and digital revolution in EU, it is time to understand as the **transition toward the Circular Economy needs to be managed together with the innovation generated by digital technologies** but since both them are not necessarily connected, the **adoption of systemic view is required**.

Web technologies and digital platforms have enhanced the opportunities of **value creation** into the innovation ecosystems by making more effective and rapid the processes of **knowledge creation, absorption and diffusion** (Romano et al., 2014; Muntaner-Perich and de la Rosa, 2007).

Industrial ecology interacts with natural ecosystems and attempts to move from a linear to cyclical or closed loop system. Like natural ecosystems, industrial ecology is in a **continual state of flux**.

The diagram illustrates the Industrial Symbiosis concept as a circular flow system. It features two main industrial units: **Production** (top) and **Secondary production** (bottom). The **Production** unit is shown with a smokestack emitting grey smoke. The **Secondary production** unit is shown with a smaller smokestack. The flow of materials and resources is as follows:

- Resources:** A globe icon on the left represents the source of resources. Two arrows point from the globe to the production units: one to **Production** labeled "Fewer Resources Extracted" and one to **Secondary production** labeled "Fewer Resources Extracted".
- Waste and Emissions:** Two arrows point from the production units back to the globe: one from **Production** labeled "Minimal Waste" and one from **Secondary production** labeled "Minimal Waste".
- Industrial Symbiosis:** Two arrows connect the production units: one from **Production** to **Secondary production** labeled "By-products" and one from **Secondary production** to **Production** labeled "By-products".
- Consumption and Recycling:** Two groups of red human figures represent consumers. One group is labeled **Consumption** and the other **Secondary Consumption**. Arrows point from the production units to these groups: one from **Production** to **Consumption** and one from **Secondary production** to **Secondary Consumption**. Two arrows point from the consumer groups back to the production units: one from **Consumption** to **Secondary production** labeled "Recycling" and one from **Secondary Consumption** to **Production** labeled "Reuse".

Digital Innovation Ecosystems for Circular Economy

Industrial symbiosis is a form of brokering to bring **companies together** in innovative collaborations, finding ways to use the waste from one as raw materials for another.

The word “**symbiosis**” is usually associated with relationships in nature, **where two or more species exchange materials, energy, or information in a mutually beneficial manner.**



Local or wider co-operation in industrial symbiosis can **reduce the need for virgin raw material and waste disposal**, thereby closing the material loop – a fundamental feature of the circular economy and a driver for green growth and eco-innovative solutions.

<https://fissacproject.eu/>

Digital Innovation Ecosystems for Circular Economy



EFFECTIVE MEMBERS	NUMBER
Institutions	8
Industries and business associations	29
Research Centres and Universities	12
Civil society	2



Working Group	Coordination
WG. 1 - Research and eco-innovation, knowledge diffusion and education	CNA, Puglia Region-ARTI, University of Bologna
WG. 2 - Policy and Governance tools	Minister of Environment DG-RIN, Minister of Economic Development, Unicircular
WG. 3 - Instruments for measuring circular economy	ENEA, Minister of Environment –DG SVI
WG. 4 - Systems and models for sustainable and circular design, production, distribution and consumption	ENEA, ENEL, Intesa Sanpaolo Innovation Center
WG. 5 - Cities and territory	Agency for Territorial Cohesion , ENEA
WG. 6 - Best practices and Integrated approaches	ENEA, Puglia Region-ARTI, Unioncamere



European Union

Digital Innovation Ecosystems for Circular Economy

#CEstakeholderEU

European Circular Economy Stakeholder Platform

A joint initiative by the European Commission and the European Economic and Social Committee

LO
OP

WHAT WE DO

STORIES & EVENTS

PARTNERS

ABOUT US

CONTACT

LOOP DIGITAL ECOSYSTEM

LO
OP

We take circular economy from strategy to action

CICERONE

ABOUT THE PROJECT

REPORTS

NEWSROOM

MULTIMEDIA

GET INVOLVED

SEARCH ...



CLOSING THE LOOP ON
CIRCULAR ECONOMY
PROGRAMMING &
FUNDING

DISCOVER MORE



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Circle-In Project

CIRCLE-IN is a cross-border cooperation project aimed at foster the sustainable economic growth of the Ionian-Adriatic area through the promotion of Circular Economy and the implementation of pilot actions in terms of technology-driven entrepreneurship.

The project is funded under the first call of the announcement Interreg V-A Greece-Italy 2014-2020.



MAIN ACTIVITIES

- ☐ Needs' assessment and readiness in the Adriatic-Ionian Area;
- ☐ Focus on the **state of the art** in theory and practice;
- ☐ Collection of **best practices** about **Circular Economy**;
- ☐ Design and development of a **project platform** as **virtual environment** for sharing knowledge and practices;
- ☐ Design of **executive programs** for developing competencies in the field of circular economy;
- ☐ Launching of an open call for **ideas' competitions and awards** for innovative entrepreneurial initiatives.

RESULTS

- ☐ Increased **number of investments** in Circular Economy;
- ☐ Increased **cooperation** among local/regional/national stakeholders;
- ☐ **Mentoring, training and counseling services**;
- ☐ **Innovation Vouchers' program**.

Circle-In Project

METHODOLOGIES

The project embraces a **research in action approach**, based on :

- ☐ Desk and on field analysis;
- ☐ Interview and benchmarking;
- ☐ Focus Groups, networking and workshops.

PROJECT PARTNERSHIP

- ☐ Chamber of Commerce of Ioannina (lead partner)
- ☐ Chamber of Commerce of Lefkada
- ☐ Chamber of Commerce of Foggia
- ☐ University of Salento, Laboratory of Management

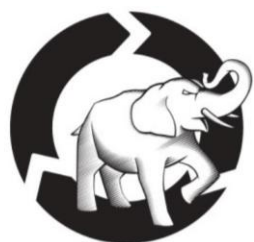


Circle-In Project: main results

- Needs assessment, readiness and state of the art about Circular Economy in the Ionian –Adriatic Area



- Identification of best practices in terms of Circular Economy Innovative Entrepreneurship

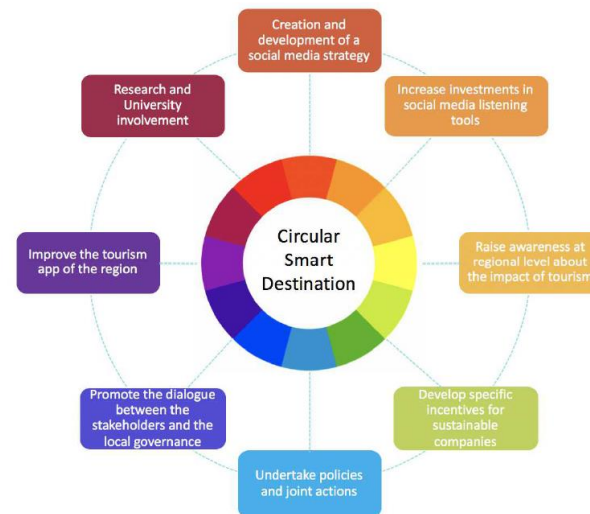
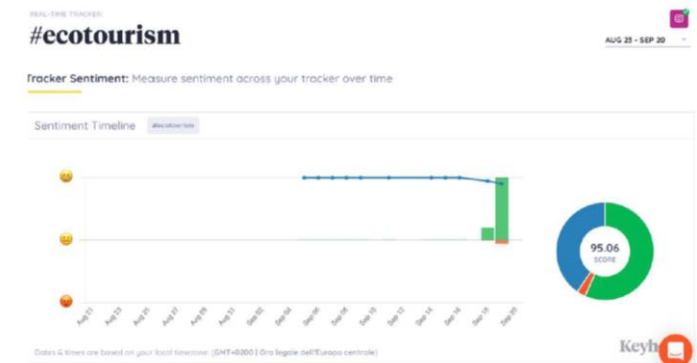


ECEPLAST
SUSTAINABLE
PACKAGING INNOVATORS



Circle-In Project: main results

Analysis of scenarios of development for the Circular Economy in the field of Agro-food and Tourism



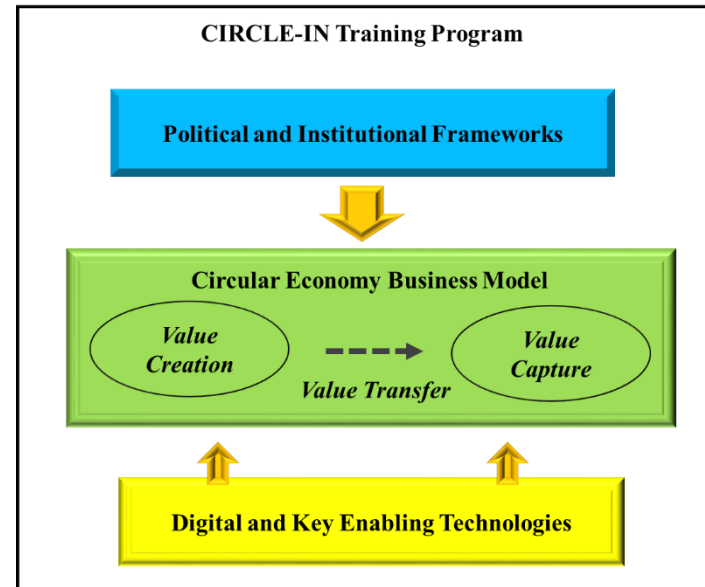
Circle-In Web Academy

Circle-In Web Academy is a training initiative aimed to promote the development of entrepreneurial competencies in the field of circular economy.

In coherence with the goals of the **CIRCLE-IN project**, the web academy aims to foster the creation of innovative mindsets and competencies in human capital and to support the exploitation of technological know-how into sustainable entrepreneurial ventures.

The initiative has been coordinated by the **Laboratory of Management Engineering** of the **University of Salento** with the collaboration of all **project's partners**.

The program of the web academy is structured around **three main thematic areas**:



Circle-In Web Academy

Circle-In Web Academy is conceived as an **experiential learning laboratory** including seminars of academics and researchers, professionals and entrepreneurs.

All the seminars will be available online after login on the project platform, starting from **October 21, 2020**, at the following link:

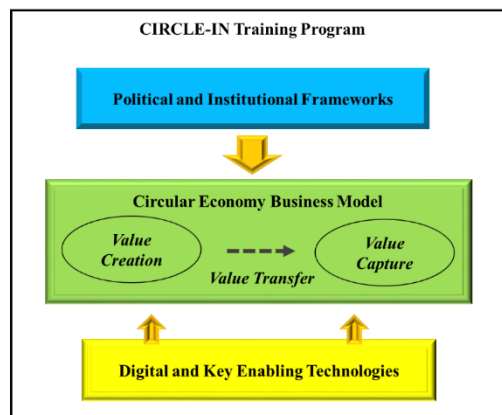
<http://platform.circle-in.eu/it/>

A **certificate of attendance** will be provided to all participants who after the seminars will make the assessment.





Circle-In Web Academy



Intro and learning objectives

Giuseppina PASSIANTE and Pasquale DEL VECCHIO, University of SALENTO

Political and Institutional Frameworks

Strategies for promoting the transition towards Circular Economy in Europe

Roberta De Carolis & Carolina Innella, ENEA

Legal Issue for Circular Economy

Matteo AVELLO, ECOCERVED Scarl

ICESP Platform, the Italian way to the Circular Economy

Grazia BARBERIO, ENEA

Sustainable Entrepreneurship Development in the EU strategy

Giusy SECUNDO, University of SALENTO

Theory in Practice: Standards and Innovative Business Models for Tourism

Valentina NDOU & Gioconda MELE, University of SALENTO

Digital and Key Enabling Technologies

Blockchain for Circular Economy

Roberto CERCHIONE, PARTHENOPE UNIVERSITY of NAPLES

Exponential Technologies: Sustainability Opportunities from Disruptive Innovation

Alessandro MARGHERITA, UNIVERSITY of SALENTO

A Multi-Sided Platform supporting Circular Economy

Gianluca ELIA, UNIVERSITY of SALENTO

Theory in practice: Eggplant, transforming wastewater into bioplastic

Vito Emanuele CAROFIGLIO, EGGPLANT srl

Theory in practice: Eceplast a sustainable packaging innovators

Nicola ALTOBELLI, ECEPLAST srl

Theory in action: Ecomet, innovative solutions for recovering metal plaf

Viola MARGIOTTA, ECOMET srl

Circular Economy Business Model

Technological Entrepreneurship for Circular Economy

Pasquale Del Vecchio, University of SALENTO

Introduction of Circular Economy in enterprises

Francesca CAPPELLARO, ENEA

Circular Business Models

Andrea URBINATI, LIUC University

Circular Economy Business Model in the production and consumption system

Paola SPOSATO, ENEA

Industrial Symbiosis: which business opportunities to support the circular economy?

Luca FRACCASCIA, SAPIENZA University of ROME and DELFT UNIVERSITY

Addressing Circular Economy through Design for X approaches

Claudio SASSANELLI, Polytechnic of MILAN

Theory in Practice: FIUSIS, European Best Practice for the Business Model

Marcello PICCINNI, FIUSIS srl

Why Growth Hacking is important in Circular Economy

Lara D'ARGENTO, Growth Mentor

Smart Tourism Destination in the Circular Economy: a business analytics perspective

Caterina MALANDUGNO, LINKS Management & Technology Spa





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Thank you for the attention!

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