

## DIGI-GRENT Project

IO Number: 2

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Entrepreneurship (DREP) Toolkit for  
Managing Quintuple Helix Cocreation in  
an Open Innovation Manner**

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## 1 Introduction

This document provides an overview of the open innovation & co-creation framework for DREP curriculum development methodology, hereafter referred to as quintuple helix co-creation & open innovation toolkit that sustain the whole vision of DIGI-GRENT in terms of ensuring a balanced view/insight of all the quintuple helix stakeholders in all the project deliverables with specific relation to the DREP curriculum.

For this document, we used the quintuple helix approach, which originated from the better known triple helix model (see figures 1 and 2).

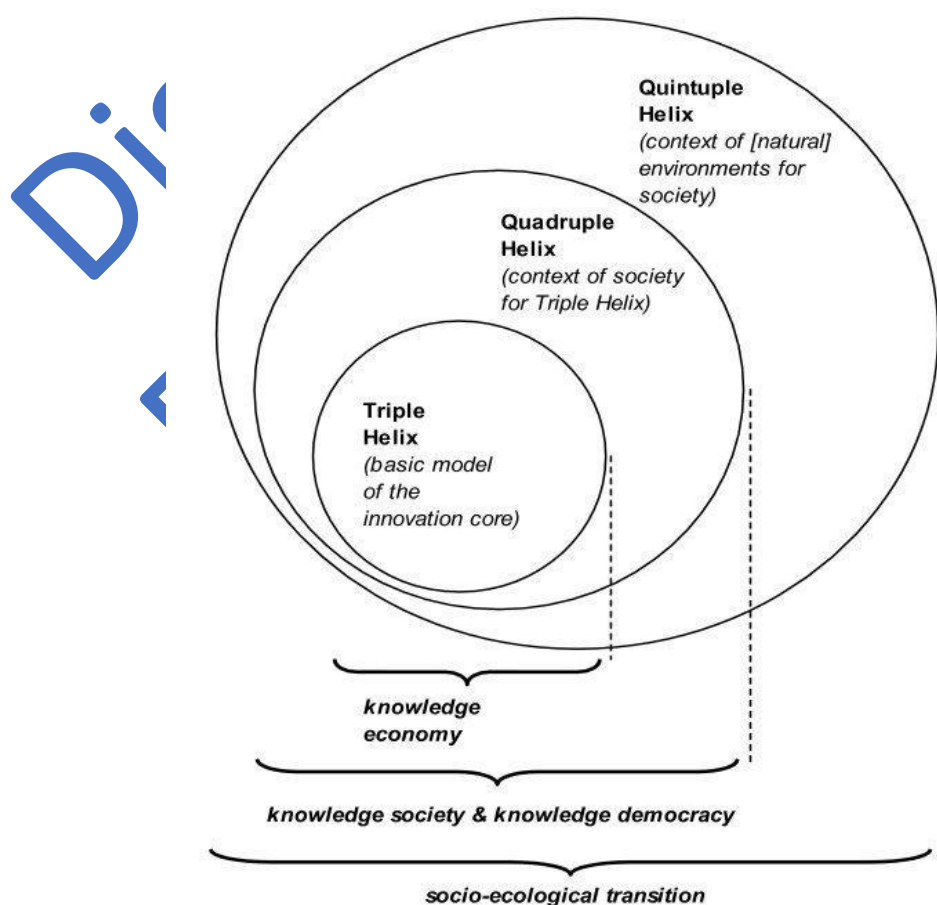




Figure 1: Knowledge production and innovation. Knowledge production and innovation in the context of the knowledge economy, knowledge society (knowledge democracy), and the natural environments of society. Modified from Carayannis and Campbell (2012, p. 18), Etzkowitz and Leydesdorff (2000, p. 112) and Danilda et al. (2009).

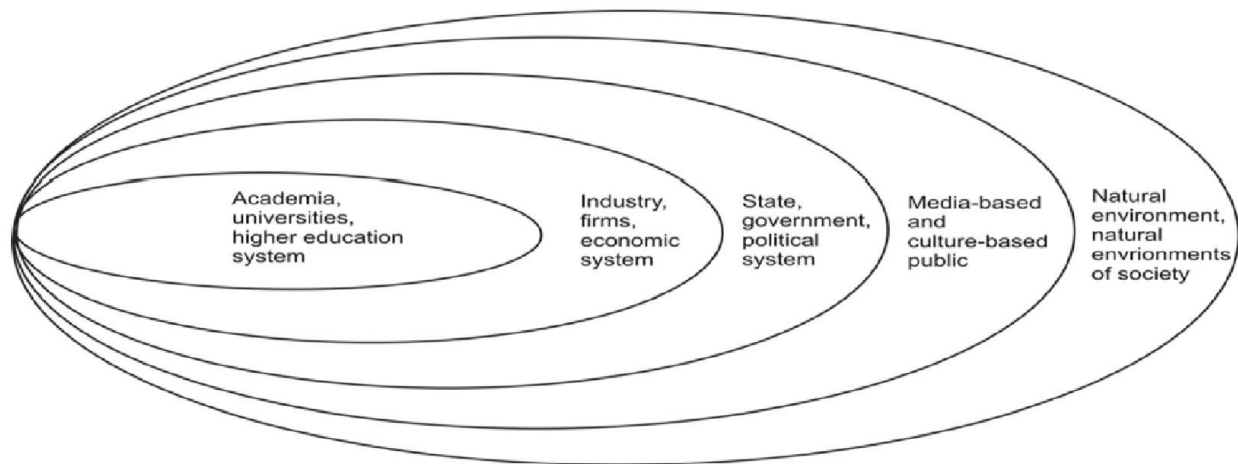


Figure 2: The subsystems of the Quintuple Helix model. Modified from Etzkowitz and Leydesdorff (2000, p. 111) and Carayannis and Campbell (2009, p. 207; 2010, p. 62).

The Toolkit for Managing Quintuple Helix Cocreation in an Open Innovation Manner is then based on the Quintuple Helix model and its functions (see figures 3 and 4)<sup>1</sup>.

<sup>1</sup> Carayannis, E. G., Barth, T. D., & Campbell, D. F. (2012). The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. *Journal of innovation and entrepreneurship*, 1(1), 1-12. [https://www.researchgate.net/profile/David-Campbell-26/publication/257884675\\_The\\_Quintuple\\_Helix\\_innovation\\_model\\_global\\_warming\\_as\\_a\\_challenge\\_and\\_driver\\_for\\_innovation/links/54130cbe0cf2fa878ad3d11a/The-Quintuple-Helix-innovation-model-global-warming-as-a-challenge-and-driver-for-innovation.pdf?origin=figuresDialog\\_download](https://www.researchgate.net/profile/David-Campbell-26/publication/257884675_The_Quintuple_Helix_innovation_model_global_warming_as_a_challenge_and_driver_for_innovation/links/54130cbe0cf2fa878ad3d11a/The-Quintuple-Helix-innovation-model-global-warming-as-a-challenge-and-driver-for-innovation.pdf?origin=figuresDialog_download)

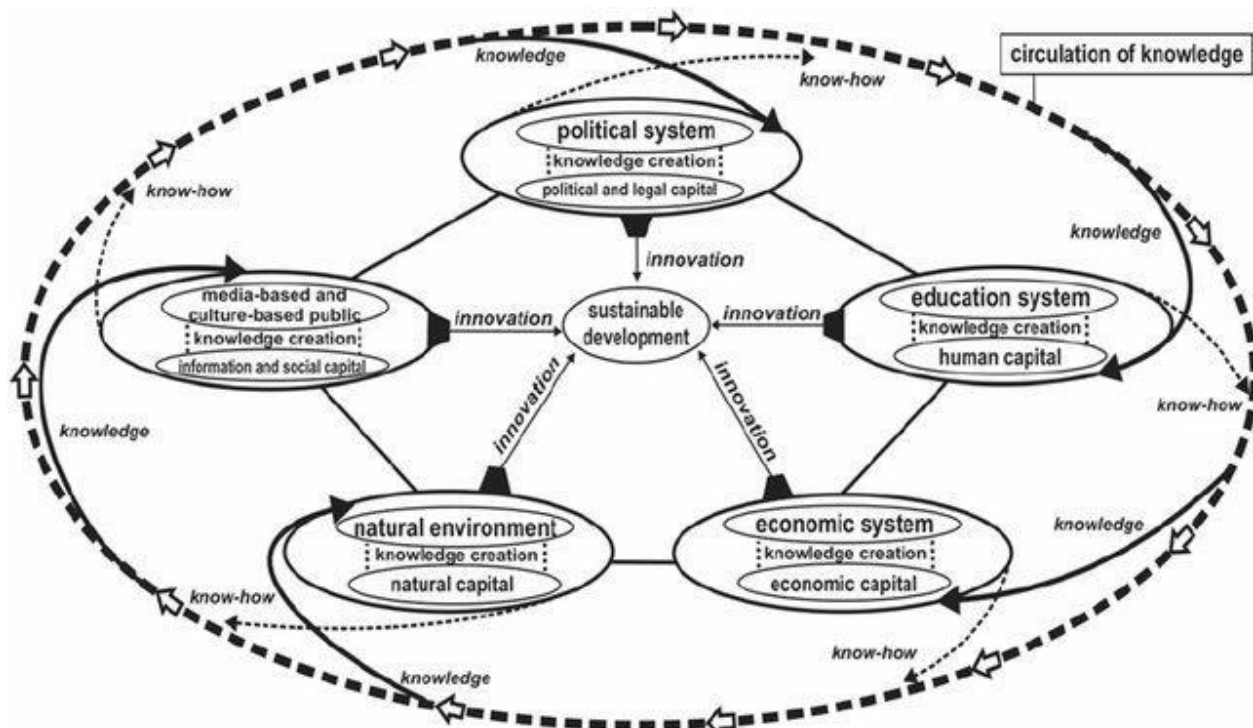


Figure 3: The Quintuple Helix model and its functions. Modified from Etzkowitz and Leydesdorff (2000), on Carayannis and Campbell (2006, 2009, 2010), and Barth (2011a).

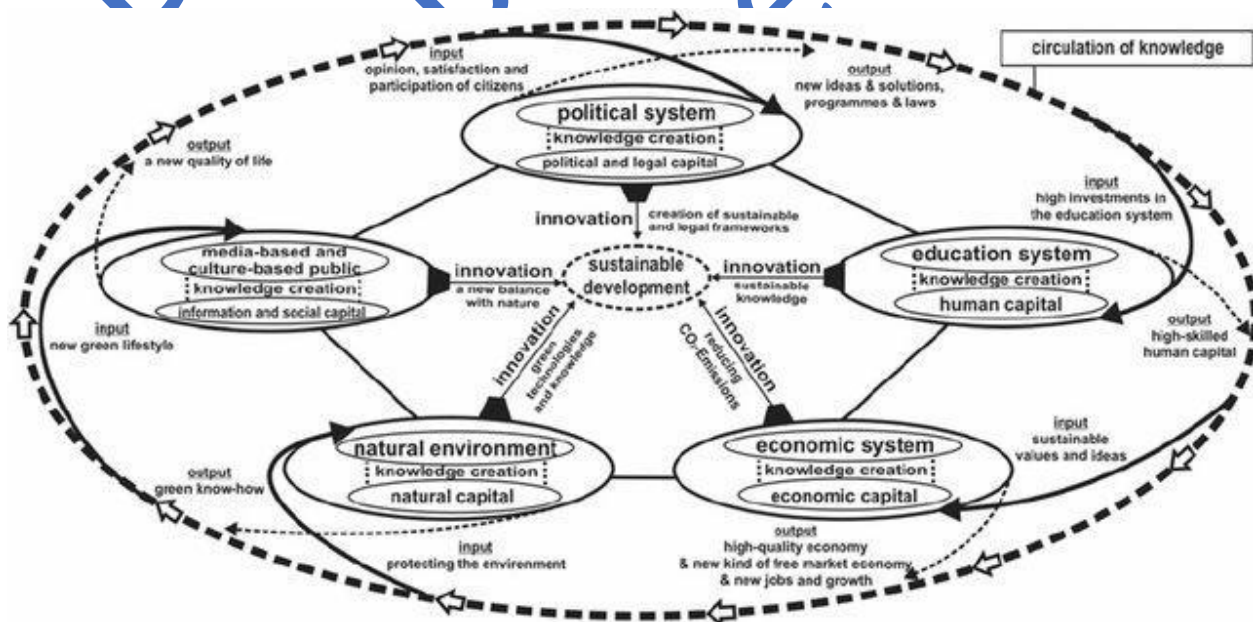


Figure 4: Effects of investments in education for sustainability. Modified from Etzkowitz and Leydesdorff (2000), on Carayannis and Campbell (2006, 2009, 2010), and Barth (2011a).



## 2 Overview & Contextual Positioning of the Quintuple Helix

### 2.1 Overview

The roles of the quintuple helix co-creation & open innovation toolkit are:

- Ensure proper goal alignment, skill-gap assessment and mitigation in relation to the DREP curriculum.
- Ensure proper face-to-face quintuple helix collaboration and co-creation during the transnational training sessions.
- Ensure proper understanding of each quintuple helix actor in order to know how to engage them in the curriculum development and to ensure their sustainable co-creation around DREP in an open-innovation manner.

### 2.2 General context

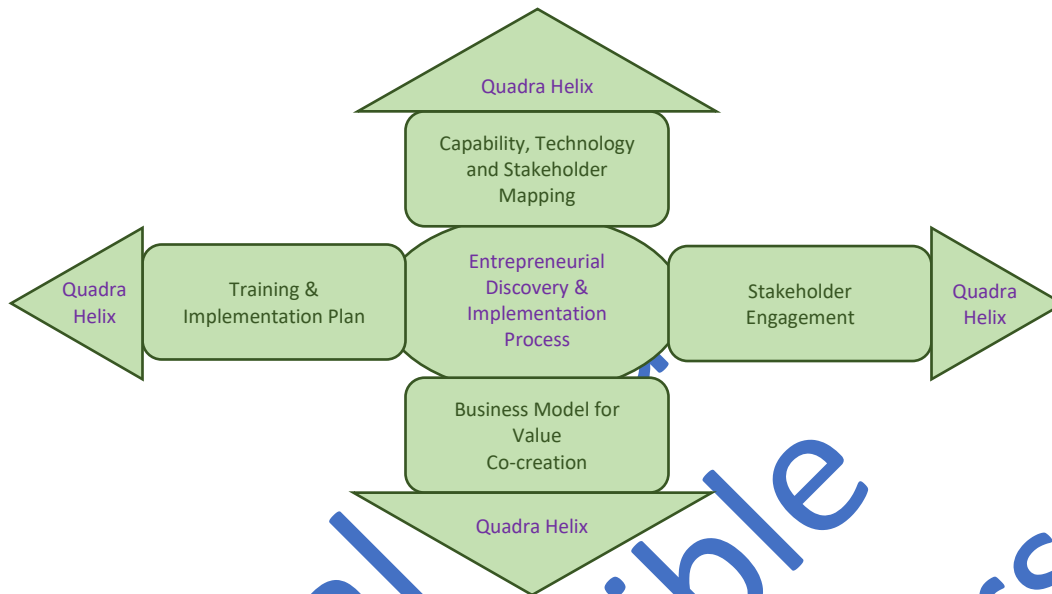
Quintuple helix co-creation & open innovation should be contextualised within the overall interpretation underlying the present situation of DREP curriculum development and expressed in the project structure.

- Science (i.e. DREP), as any other institution of modernity (political institutions, trade unions, institutional religions, etc.), is suffering from the **shift from modern to post-modern society**. Quite paradoxically, while science is becoming technically stronger (in terms of impacts and results), it is also becoming socially weaker.
- Some **critical issues** pertaining to science & DREP curriculum development are, for example:
  - decreasing authoritativeness and social recognition of scientific institutions and, to a certain extent, decreasing the credibility of scientists
  - growing diffusion (as an effect of the emergence of the so-called "post-factual age") of societal views (of facts, events, processes) which are explicitly alternative or even





- opposite to those based on science, often propelled by anti-science attitudes and pseudo-scientific beliefs
- ever-stronger connection between innovation, environmental and ethical and policy issues, triggering and feeding social tensions on controversial issues and "public battle" among experts
  - increasing sensitiveness of the public towards science-related risks
  - people's decreasing trust in scientific institutions leading to a growing demand for accountability and transparency
  - need for science & innovation institutions to increasingly demonstrate their social, environmental and economic usefulness to citizens as taxpayers.
- It is easy to see that these critical issues are similar to those affecting the other social institutions of modernity. See for example some of the phenomena affecting **policy**:
- decreasing authoritativeness, social recognition and credibility of politicians and political parties
  - growing diffusion of anti-political and populist views, leading to a decreasing people's propensity to vote
  - ever-stronger connection between politics and ethical issues, especially regarding aspects like environmental sustainability, privacy, security, medical issues, or civil rights
  - increasing sensitiveness of the public towards risks connected to politics (for example, corruption, connections between politics and industry, high costs of political institutions, etc.)
  - people's decreasing trust in politicians and political institutions leading to a growing demand for accountability and transparency
  - need for politicians and political institutions to increasingly demonstrate their capacity and usefulness to citizens as taxpayers
  - need for better accountability of the environment towards fulfilling the SDG goals
  - all the above can be fulfilled through goal alignment, skill gap mitigation and co-creation



Therefore, there is a high need for a quintuple helix co-creation/communication in all aspects of nowadays society and especially in the prospect of DREP curricula development.

Therefore, in order for the European Union (EU) to be successful in implementing and expanding open innovation as one of the main driver of its socio-economic growth, higher education institutions (HEIs) must be able to produce independent, creative, entrepreneurial individuals who understand inter- and multidisciplinary challenges of the socio-economic environment and as a result, can contribute to open innovation in true convergence with technological growth & enterprise digitalisation. EU's success in the global competition is heavily dependent on the ability of the economy to produce innovative enterprises with high growth potential that can give stimulus to the actors of the socio-economic environment. Creating a common framework and a unified entrepreneurial ecosystem across the EU requires a core engine of open innovation and co-creation among all the involved stakeholders in order for the inequality among the regions of the EU to be decreased. Achieving an empowered society that co-creates together with the market will provide a much proper context for growth, as society is the main driver of growth. Secondly, pierced by severe environmental concerns and eco-innovation, society pushes the actors (and vice-versa) for more innovative growth mechanisms that are more resource-efficient and environmentally sustainable. Such shift not only ensures long terms sustainability and





societal development by improving living conditions, but it also drives the need for more innovation and knowledge exploitation towards finding unique solutions to grow in a digitally-driven QUINTUPLE HELIX context (comprising of university, industry, policy, society, environment) where digital and responsible (socially & environmentally) entrepreneurship (DREP) should be the driver of sustainable development.

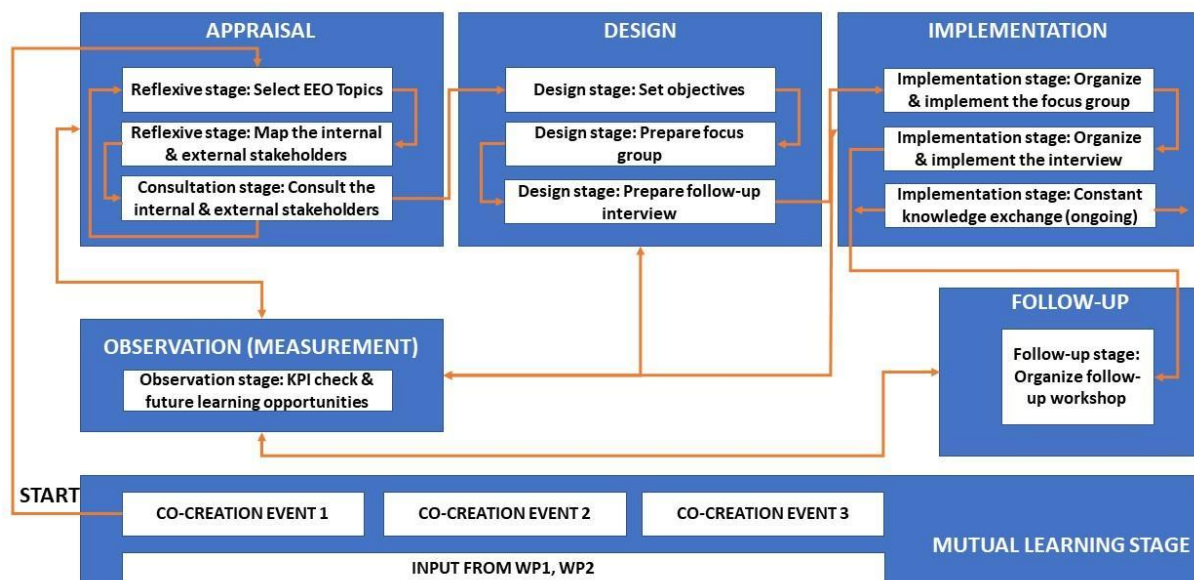
One way of achieving a working quintuple helix to foster DREP is through co-creation. Chesbrough (2013) argued that co-creation is the cornerstone of open innovation practices in today's society. For example, through co-creation, academia can gain useful input from the other stakeholders, which will eventually lead to more market-oriented curriculum and better prepared graduates capable to implement responsible entrepreneurship (Chesbrough 2010; Chesbrough 2011). More recently, Carayiannis (2015) introduced the concept of targeted open innovation, arguing that open innovation should be focused, strategic, and tailored to the current needs of the stakeholders; thus universities need to enhance their curricula accordingly. Hence, open innovation and co-creation between academia and stakeholders will highly increase academia's capacity of producing more market-oriented curricula that will lead to graduates capable of being next-generation leaders in responsible entrepreneurship.

To this end, DIGI-GRENT responds to this need by aiming to develop an innovative, transnational framework that will improve the knowledge and skills of academic institutions to produce more market/start-up oriented DREP curricula, reducing the barriers in this field. The project consortium comprises key academics, investors, industry/employment associations, start-up associations, and societal growth partners (and associated partners) from different sectors who will co-create the envisaged DREP curriculum and will pilot it through an open innovation and co-creation virtual learning environment (VLE). This outcome is directly pertinent to quintuple helix-academia cooperation for innovation and best practices with respect to DREP, and can also support policy reform in this area, leading to more prepared graduates ready for the start-up market. DIGI-GRENT also follows up the recent plans of the EU to promote improved, efficient and clean operations by 2050 and is also relevant to the EU2020 targets for R&D, climate change, **This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.**

energy efficiency, entrepreneurship and social cohesion. This makes DIGI-GRENT directly relevant to the current objectives of the participating & affiliated quintuple helix organisations.

Additionally, DIGI-GRENT is highly aligned at a policy level with the goals of Strategic Partnerships for academia-market-society collaboration and the promotion of innovation and best practices, with the Headline Education Target and with the EU Higher Education Modernisation Agenda. Similarly, DIGI-GRENT is in line with the European cooperation in education and training (ET2020) strategy by fostering life-long learning, improving the quality of education through stakeholder engagement, and promoting creative thinking towards DREP. The following reports and efforts are the base foundation of DIGI-GRENT: CEDEFOP's report on Environmental Skill Promotion (2016); OECD's report on Digital Entrepreneurship Skills for Young Entrepreneurs (2015); EU Commission's JRC Report on 2035 Sustainable Economy (2015); EU's EPAL platform report on Sustainable Business Skills (2017); EU Commissions New Skill Agenda for Europe (Employment and Social Performance) (2016); WEF Report on Graduate Skills for Enterprise (2016).

### 3 Overall method for quintuple helix co-creation & open innovation



### 3.1 Appraisal

The first main step in the implementation of the quintuple helix co-creation is the identification of the actual (ongoing/new) interests of the main initiating institution (in relation to DREP needs to be shown by IO1) and description of its main features as exemplified in the table below:

<b>Organiser</b>	<name of the institution>
<b>Description</b>	<few lines denoting the main needs in relation to DREP>
<b>Stakeholders</b>	<list which actors internal & external are involved>

### 3.2 Mapping

The next step is the stakeholder mapping process (identify internal + external stakeholders).

<b>List the internal stakeholders</b>	<p>Internal stakeholders can be:</p> <ul style="list-style-type: none"> <li>• The research/teaching team (PDRAs, PhDs, Academics, RAs, etc.)</li> <li>• Teaching coordinator / Teaching office</li> <li>• Finance team</li> <li>• Any DREP-related office</li> <li>• Start-up support team</li> <li>• Digitalisation team</li> <li>• Sustainability/Responsibility officers</li> <li>• Employability offices</li> </ul> <p>Provide a list with names, full titles/positions and contact of all the aforementioned stakeholders.</p>
	<p>External (quintuple helix) stakeholders can be:</p> <ul style="list-style-type: none"> <li>• Other external institutions interested in DREP</li> </ul>

**List the external stakeholders**

- Local/regional/national policy bodies
- Other field-compatible research centres, researchers and companies
- Citizens and NGOs
- DREP influencers, industries
- Start-ups, incubators, methods
- Business angel networks, investors
- Regional funds authorities
- Environmental organisation & certification authorities
- Digital hubs
- Start-up associations
- Open innovation & citizen hub association

**How to identify the external stakeholders:**

- Undertaking a sectoral profile in the region/country to identify the key external players in this field
- Undertaking a sectoral profile in other successful regions/countries from the EU where the stakeholder-group is well-established in order to identify new relevant external stakeholders
- Identification of the main regulatory framework that governs the DREP sector in order to reach the responsible institution (that monitors/control the regulation)
- Analysis of the regional/national innovation & science communication policy framework in order to understand the actors involved



	<ul style="list-style-type: none"> <li>• Analysis of similar research performed by fellow (or top-performing) institutions in order to identify the names of the innovators in this field</li> </ul> <p>Provide a list with names, full titles/positions and contact of all the identified stakeholders.</p>
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### 3.3 Consultation

After the stakeholders are mapped (identified), a consultation step will follow:

Survey/Interview	<p>An informal survey (2 responses per stakeholder type) targeting both internal &amp; external stakeholders will be implemented. The survey will contain the following items:</p> <ul style="list-style-type: none"> <li>• Description of the DREP challenge (needs)</li> <li>• Description of the purpose of the co-creation</li> <li>• Assessment of the know-how/implementation of DREP in the stakeholders' institution/work</li> <li>• Assessment of the stakeholder's institutional DREP governance settings</li> <li>• Assessment of the stakeholder's interest, motivation, perceived usefulness of DREP</li> <li>• Assessment of the relevance/usefulness of key-related DREP practices emerged from IO1</li> <li>• Qualitative input related to the quintuple helix implementation (how to bring the quintuple helix (related to the ongoing task of developing DREP training outputs) together more effectively</li> </ul>
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	<ul style="list-style-type: none"> <li>Assessment of the stakeholder's interest in participating in the co-creation events, follow-up interview and follow-up workshop related to the envisioned experiment</li> </ul>
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The quintuple helix co-creation event design step consists of the blueprint required to engage quintuple helix stakeholders in co-creation of DREP training outputs. In order to proceed to this stage, the stakeholder mapping and consultation must have been finalised to ensure that the entire stakeholder group and their views are properly considered in the experiment design process. As a guide for the design phase, the following table provides an overview:

### 3.4 Design

<b>Organizer</b>	<name>
<b>Topic</b>	<topic.. i.e. DREP area >
<b>Objectives</b>	<p>Stipulate the DREP objectives of the co-creation (based on the identified needs)</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>Identify how to facilitate DREP start-ups to solve local needs?</li> <li>Assess what policy drivers would help DREP start-ups to scale up?</li> <li>What are the key trends in DREP and how do these affect society?</li> </ul>
<b>Focus group</b>	<p>Organise a first focus group with internal + external stakeholders in order to discuss the objectives of the quintuple helix co-creation. This implies:</p> <ul style="list-style-type: none"> <li>Set the date &amp; time of the focus group (2.5h)</li> </ul>





	<ul style="list-style-type: none"> <li>• Send an invitation to the identified stakeholders to participate in the focus group</li> <li>• Implement the focus group with the objectives that have been set.</li> </ul> <p>The goal of this focus group would be to open to the debate for the achievement/implementation of the previously set objectives. As a result, a clear set of actions will emerge. After this focus group, each stakeholder will be asked to "resume" their normal operation in their institutions and assess/identify how the objectives (through the emerged set of actions) can be implemented (in theory) and what changes/further actions would be required. Such changes can be operational, regulatory, etc. In any case, the idea is to minimise the effort for the stakeholders in order to ensure their participation.</p>
<b>Quintuple helix co-creation implementation approach</b>	<p>The multi-stakeholder management during the focus groups will be implemented following the forthcoming guideline(s):</p> <ul style="list-style-type: none"> <li>• Introductions &amp; overview on the research, chosen DREP needs, objectives of the quintuple helix co-creation.</li> <li>• <u>For each stakeholder</u>: current awareness and interest related to the DREP needs[repeat for each need]</li> <li>• <u>For the internal stakeholders</u>: what do you require from industry, NGOs and policy in order to better develop DREP curricula into your ongoing teaching framework?</li> <li>• <u>For the internal stakeholders</u>: how can you better involve society in your teaching material design, implementation &amp; follow-up</li> </ul>



stages and how would this impact on embedding the chosen DREP pillars in your curriculum ?

- For industry & NGOs: what would make you engage more with universities (i.e. internal stakeholders) in order to facilitate the development of DREP curricula properly? What perceived benefits do you foresee and what are the blockers? How is the policy framework supporting such engagement?
- For policymakers: How should the co-creation between the internal stakeholders, society and industry evolve in order to properly contribute to the national/regional policies on supporting DREP curricula? What are your main mechanisms to control and monitor the developments of DREP curricula implementation (and how do you measure the impact (graduate know-how) at a local/regional/national level)?
- For industry & policy: Would you be willing to provide funding for boosting the embedment of the DREP curricula in other universities?
- For society/NGOs: How would you expect to be involved and contribute to the design, implementation and follow-up stages of this ongoing DREP curriculum development? How will your contribution impact on embedding the DREP curriculum in universities?



	<ul style="list-style-type: none"> <li>• <u>Consensus</u>: Direct the discussions towards achieving (if possible) a consensus among the stakeholders and set the following next steps that each stakeholder will have to consider.</li> </ul>
<b>Follow-up interview/questionnaire</b>	<p>Organise a follow-up interview/questionnaire with (the same) internal + external stakeholders in order to discuss the follow-up on the actions set in the first focus group.</p> <p>The objective would be to understand to what extent the previously set actions can be implemented and if (perhaps) any other blockers are emerging while also updating on the research progress. This would enable the internal stakeholders to incorporate progress feedback in their process of assessing the implementation of the DREP curriculum.</p> <p>Guidelines:</p> <p>The targets upon which the progress should be reported are:</p> <ul style="list-style-type: none"> <li>○ <u>Internal stakeholders (as well as external researchers/ universities)</u>: Identify how to involve the quintuple helix stakeholders for better boosting this co-creation for DREP curriculum development. A practical approach could be adopted by the internal stakeholders by piloting the most relevant DREP needs that have been debated during the co-creation meeting.</li> <li>○ <u>Policymakers</u>: identity what policy changes are required (and if they are feasible) to better support the quintuple helix co-creation around DREP.</li> </ul>



- Industry & NGOs: identify potential cooperation opportunities with the internal stakeholders and what would be the framework/expected outcomes (win-win) in terms of enhancing the development of marker-oriented DREP curricula.
- Society & NGOs: identify the current/ongoing needs (based on the overall context discussed in the focus group & related to the chosen DREP needs) and propose ways for the internal stakeholders to account for them in the research stages.

Each stakeholder will be contacted by phone for a brief interview (30 minutes) in order to follow up for each of the set targets.

### 3.5 Observation

The quintuple helix co-creation will be implemented based on the previously developed design. Throughout the implementation, inter-co-creation knowledge exchanges (within DIGI-GRENT) will take place. During the implementation of the quintuple helix co-creation, the teams will promote an idea exchange among them so as to build a common view of the open innovation & knowledge-flows and to learn from each other.

The ultimate role of observation is not to act as a corrective measure but to identify learning opportunities that will be discussed in the follow-up quintuple helix co-creation events. The observation will take place at the following stages:

- Initial stage (after the quintuple helix co-creation design is finalised)
- Mid-stage (after the follow-up interviews)



- Final stage (after the DREP curricula are fully developed)

The observation will be based on the following co-creation KPIs:

**Quantitative:**

- Representation of each internal & quintuple helix actor
- Interest in DREP of each internal & quintuple helix actor [at the beginning & end of the co-creation ]
- Awareness of DREP of each internal & quintuple helix actor [at the beginning & end of co-creation ]
- Perceived usefulness of DREP of each internal & quintuple helix actor [at the beginning & end of the co-creation]
- Number of DREP best practices, curricula, case studies evaluated and highly rated by the stakeholders
- Number of internal stakeholders involved in the co-creation
- Number of quintuple helix consensus solutions (common agreed plans/steps) for supporting the collaboration around DREP

**Qualitative:**

- Policy change recommendations
- Organisational change recommendations
- Industry proposals for collaboration with academia
- Society-driven proposals for collaboration with academia
- Observation of result/best practice multiplication in the quintuple helix ecosystem
- Number of DREP start-ups emerged/scaled-up from this exercise



## 4 Operationalising the quintuple helix co-creation

The quintuple helix co-creation approach described in this document has been used in all of DIGI-GRENT's outputs, however, the best example (show-case) of how this is taken into practice is shown by each training event (C1, C2, C3) organising according to the Training Scheme Methodology document. Each training is basically a quintuple helix co-creation, which actors from each relevant quintuple helix sector gather in various setting (i.e. workshops, training, dissemination & co-creation sessions) in order to co-produce the targeted objectives. In the case of C1, C2, C3, the objectives would be to: pilot & subject to open innovation & co-creation the DREP training material & VLE in a quintuple helix context, identify further trainings needs and raise awareness on DREP. In order to organise these sessions, each training event organiser has utilised the quintuple helix co-creation guidelines for engaging the stakeholders and then they have operationalised the co-creation by relying on the training methodology.



## 5 Appendix 1 – key quintuple helix stakeholders per organisation

This section covers the identification of quintuple helix stakeholders for DREP in the involved countries (Spain, Greece, Italy and Poland). For every organisation, stakeholders to be involved in co-creation were identified, comprising:

- Academia: higher education system, public and private research bodies, universities, education and training, science and technology parks, technology transfer offices, etc.
- Business/industry: economic system, manufacturing and services, primary sectors, financial sector, creative industries, social sector, large firms, SMEs, start-ups, cluster and business organisations, etc.
- Government: central and public administration (or other relevant levels), members of ministries, representatives of municipalities, local government bodies, policymakers, agencies for regional development, business advice, public advice, public procurement offices, incubators, etc.
- Society: NGOs and citizens initiatives related to societal challenges, consumers' associations, media-based public, culture-based public, etc.
- Environment: natural environment, natural environments of society and economy, knowledge society and knowledge economy, etc.

### 5.1 Spain – UAL

#### UNIVERSIDAD DE ALMERIA

Dimension of the Quintuple helix	Examples of stakeholders for DREP
Academia	<ul style="list-style-type: none"><li>• Vicerectorate of Digital Transformation (UAL)</li><li>• ITC Services (UAL)</li><li>• Research Groups from the UAL's ICT area (8 groups: TIC129, TIC019,</li></ul>



	<p>TIC194, TIC242, TIC181, TIC221 YU TIC 146)</p> <ul style="list-style-type: none"> <li>• Higher Engineering School (UAL)</li> <li>• Computing Department (UAL)</li> <li>• Research Center in Social Economy Law and in the Cooperative Enterprise (CIDES)</li> <li>• Center for the Development and Transfer of Mathematical Innovation in Business (CDTIME)</li> <li>• Computer Students Association Almería (UNIA)</li> </ul>
Business/industry	<ul style="list-style-type: none"> <li>• Spanish Confederation of Information Technology, Communication and Electronics Companies (CONETIC)</li> <li>• Telefónica España</li> <li>• Orange España</li> <li>• Amadeus IT Group</li> <li>• Vodafone España</li> <li>• Indra</li> </ul>
Government	<ul style="list-style-type: none"> <li>• Agency for Innovation and Development of Andalusia (IDEA)</li> <li>• Andalusian Entrepreneurship Centers (CADE)</li> <li>• Regional Ministry of Economic Transformation, Industry, Knowledge and Universities (Junta de Andalucía)</li> <li>• ICT User Service Center (Junta de Andalucía)</li> </ul>
Society	<ul style="list-style-type: none"> <li>• Internet Users Association</li> <li>• Fundación Telefónica España</li> <li>• Fundación Vodafone España</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Andalusian Centre for the evaluation and Monitoring of Global Change (CAESCG)</li> <li>• Fundación Tecnología Social (FUNTESO)</li> <li>• Fundación Cibervoluntarios</li> </ul>



## 5.2 Spain – Femeval

### FEDERACION EMPRESARIAL METALURGICA VALENCIANA

Dimension of the Quintuple helix	Examples of stakeholders for DREP
Academia	<ul style="list-style-type: none"> <li>• UNIVERSIDAD POLITECNICA VALENCIA</li> <li>• FLORIDA UNIVERSITARIA</li> <li>• UNIVERSIDAD DE VALENCIA</li> </ul>
Business/industry	<ul style="list-style-type: none"> <li>• VELYEN ELEVACION Y ENGRASE SA</li> <li>• TALLERES LOMA SL</li> <li>• MANTENIMIENTOS ESBER SL</li> <li>• DINAMIC ABRASIVOS SL</li> </ul>
Government	<ul style="list-style-type: none"> <li>• Conselleria d'Economia Sostenible, Sectors Productius, Comerç i Treball</li> <li>• DIPUTACION DE VALENCIA</li> <li>• LABORA - Servicio Valenciano de Empleo y Formación: reglamento</li> </ul>
Society	<ul style="list-style-type: none"> <li>• FUNDACION ENTOR</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Conselleria de Agricultura, Desarrollo Rural, Emergencia Climática y Transición Ecológica</li> </ul>

## 5.3 Greece – SEERC

### KENTRO EREVNON NOTIOANATOLIKIS EVROPIS ASTIKI MI KERGOSKOPIKI ETAIREIA

Dimension of the Quintuple helix	Examples of stakeholders for DREP
Academia	<ul style="list-style-type: none"> <li>• University of York Europe Campus, CITY College</li> <li>• Aristotle University</li> <li>• University of Macedonia</li> <li>• University of Western Macedonia</li> <li>• University of Larisa</li> <li>• University of Thessaly</li> </ul>

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	<ul style="list-style-type: none"> <li>• University of Athens</li> <li>• Athens University of Economics and Business</li> <li>• University of Piraeos</li> <li>• University of Crete</li> <li>• University of the Aegean</li> </ul>
Business/industry	<ul style="list-style-type: none"> <li>• Association of ICT Companies</li> <li>• Greek Exporters Association</li> <li>• Technopolis Athens</li> <li>• Technopolis Thessaloniki</li> <li>• Pfizer Startups</li> <li>• Microsoft Innovation Center</li> <li>• CISCO Digital Transformation Center</li> <li>• Startech ventures</li> <li>• Hellenic Business Angels Network</li> </ul>
Government	<ul style="list-style-type: none"> <li>• Municipality of Thessaloniki</li> <li>• Municipality of Athens</li> <li>• Ministry of work</li> <li>• Ministry innovation, science and technology</li> <li>• Ministry of digitalization</li> <li>• Prefecture of Central Macedonia</li> </ul>
Society	<ul style="list-style-type: none"> <li>• Youth, Technology, Employment</li> <li>• OKThess</li> <li>• YES Entrepreneurs</li> <li>• IOM</li> <li>• Navarino Network</li> <li>• Center for Innovation and Entrepreneurship</li> <li>•</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• CSR Network</li> <li>• Circular Greece</li> </ul>

## 5.4 Greece – SEVE

### SYNDESMOS EXAGOGGEON VORIOU ELLADOS

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Dimension of the Quintuple helix	Examples of stakeholders for DREP
Academia	<ul style="list-style-type: none"> <li>• UNIVERSITY OF MACEDONIA</li> <li>• ARISTOTLE UNIVERSITY OF THESSALONIKI</li> <li>• DEMOCRETUS UNIVERSITY</li> <li>• INTERNATIONAL UNIVERSITY THESSALONIKI</li> </ul>
Business/industry	<ul style="list-style-type: none"> <li>• OK THESS</li> <li>• ALEXANDER INNOVATION ZONE</li> <li>• TECHNOPOLIS-THESSALONIKI ICT BUSINESS PARK</li> <li>• THESS INTEC – TECHNOLOGICAL PARK OF THESSALONIKI</li> </ul>
Government	<ul style="list-style-type: none"> <li>• CERTH CENTRE FOR RESEARCH &amp; TECHNOLOGY HELLAS</li> <li>• MUNICIPALITY OF THESSALONIKI</li> <li>• OTHER MUNICIPALITIES IN GREECE I.e CRETE, TRIKALA etc</li> <li>• REGION OF CENTRAL MACEDONIA</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• INTERBALKAN ENVIRONMENTAL CENTER</li> <li>• ARKTOUROS</li> <li>• GREEK ORNITHOLOGICAL SOCIETY</li> </ul>

## 5.5 Italy – ISTUD

### FONDAZIONE ISTUD PER LA CULTURA D'IMPRESA E DI GESTIONE

Dimension of the Quintuple helix	Examples of stakeholders for DREP
Academia	<ul style="list-style-type: none"> <li>• Università Cattolica del Sacro Cuore – Milano</li> <li>• Università degli Studi di Milano</li> <li>• Università degli Studi dell'Insubria</li> <li>• Università degli Studi di Palermo</li> </ul>



	<ul style="list-style-type: none"><li>• Università di Milano Bicocca</li></ul>
Business/industry	<ul style="list-style-type: none"><li>• IBM</li><li>• Elica</li><li>• Gruppo Sapio</li><li>• Barilla</li><li>• Q8</li><li>• Partesa Heineken</li><li>• Angelini</li><li>• Coca Cola HBC Italia</li><li>• Conad</li><li>• Cisco</li><li>• Nestlé</li></ul>
Government	<ul style="list-style-type: none"><li>• Assolombarda Confindustria Milano Monza e Brianza</li><li>• Assobiotech</li><li>• Assobiomedica</li><li>• Asfor – Associazione Italiana per la Formazione Manageriale</li><li>• Aldai Federmanager</li><li>• Aiesec</li><li>• Comune di Milano</li><li>• Regione Lombardia</li><li>• Regione Piemonte</li><li>• Miur, Ministero dell’Istruzione, dell’Università e della Ricerca</li><li>• Ministero dello Sviluppo Economico</li><li>• Commissione Europea, rappresentanza in Italia – Ufficio di Milano</li></ul>
Society	<ul style="list-style-type: none"><li>• ABIS – Academy of Business and Society</li><li>• Eduniversal</li><li>• EFMD European Foundation for Management Development</li><li>• ETF – European Training Foundation</li><li>• THA Triple Helix Association</li></ul>
Environment	<ul style="list-style-type: none"><li>• Kyoto Club</li></ul>





- PRME – Principles for Responsible Management Education
- Ministero dell'Ambiente

## 5.6 Poland – UoL

### UNIwersytet Łódzki (Faculty of Management)

Dimension of the Quintuple helix	Examples of stakeholders for DREP
Academia	<ul style="list-style-type: none"> <li>• Technical University of Lodz</li> <li>• Medical University of Lodz</li> <li>• University of Almeria</li> <li>• ISTUD</li> <li>• University of Lancaster</li> <li>• University of Sheffield</li> </ul>
Business/Industry	<ul style="list-style-type: none"> <li>• Business Council of the Faculty of Management, including:               <ul style="list-style-type: none"> <li>○ PZU S.A.</li> <li>○ PGE</li> <li>○ Dachser</li> <li>○ Santander Universidades</li> <li>○ PKO Bank Polski</li> <li>○ Gatta</li> <li>○ Infosys</li> <li>○ Marvel</li> <li>○ Deloitte</li> <li>○ Velg</li> <li>○ Ceramika Paradyż</li> </ul> </li> </ul>
Government	<ul style="list-style-type: none"> <li>• City of Lodz office</li> <li>• Marshal's office of Lodz voivodship</li> <li>• Polish Agency for Enterprise Development</li> <li>• Łódź Regional Development Agency</li> </ul>
Society	<ul style="list-style-type: none"> <li>• Foundation for Promotion of Entrepreneurship</li> </ul>



	<ul style="list-style-type: none"> <li>• Lodz Chamber of Industry and Commerce</li> <li>• Responsible Business Forum</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Lodz Environmental Protection and Water Management Fund</li> <li>• Ministry of Climate</li> <li>• Sendzimir Foundation</li> </ul>

## 5.7 Poland – FRP/FPE

### FUNDACJA ROZWOJU PRZEDSIĘBIORCZOŚCI

Dimension of the Quintuple helix	Examples of stakeholders for DREP
Academia	<ul style="list-style-type: none"> <li>• University of Lodz</li> <li>• Technical University of Lodz</li> <li>• Medical University of Lodz</li> <li>• Technology Transfer Centre of University of Łódź, Technical University of Łódź and Medical University of Łódź</li> <li>• Statistical Office in Łódź: Łódź Regional Research Centre, Centre of Small and Medium Enterprises</li> </ul>
Business/industry	<ul style="list-style-type: none"> <li>• ICT Central Poland Cluster</li> <li>• Textile and clothing cluster of the Władysław Strzmiński Academy of Fine Arts in Łódź</li> <li>• Industrial Development Agency S.A.</li> <li>• Polish Chamber of Leather Industry, Institute of Leather, Institute of Textiles, Polish Textile Association, Employers' Union of Clothing and Textile Industry PIOT</li> <li>• Lodz Special Economic Zone Sp. z o.o.</li> <li>• Association of Fashion Industry Employers LEWIATAN</li> </ul>



Government	<ul style="list-style-type: none"><li>• European Commission</li><li>• Ministry of Development, Labour and Technology</li><li>• Ombudsman for Small and Medium Enterprises</li><li>• Marshal's Office of Łódzkie Voivodeship</li><li>• City Office of Lodz</li><li>• Polish Agency for Enterprise Development</li><li>• Voivodeship Labour Office in Łódź</li><li>• Łódź Regional Development Agency</li></ul>
Society	<ul style="list-style-type: none"><li>• Participation in discussion panels and consultative bodies concerning the development of the Łódź region: membership in the Revitalisation Committee at the Łódź City Council, membership in the Council of NGOs of Łódzkie Voivodeship, membership in the County Labour Market Council and cooperation with the Centre for Promotion and Development of Civic Initiatives OPUS.</li><li>• Municipal Consumer Ombudsman</li></ul>
Environment	<ul style="list-style-type: none"><li>• Faculty of Biology and Environmental Protection, University of Łódź</li><li>• Agency for Energy Use and Conservation</li><li>• Polish National Association "Energy and Environment Protection (SAPE-POLAND)</li><li>• Bioenergy for the Region cluster</li><li>• Voivodeship Fund for Environmental Protection and Water Management</li><li>• Regional Directorate for Environmental Protection</li></ul>