

Module 6: From Vision to Implementation

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Module Overview

In this module, local authorities can learn how to move Industrial-Urban Symbiosis from conceptual ideas to actionable initiatives. The module covers identifying and prioritizing synergies, embedding I-US in local strategies, and designing effective governance and business models for circular hubs. Learners gain practical insights into mapping resource flows, evaluating technical, economic, and social impacts, aligning projects with broader policy objectives, and establishing sustainable operational and financial structures.

- [Chapter 6.1: Identifying and Prioritizing Synergies](#)
- [Chapter 6.2: Embedding I-US in Local Strategies](#)
- [Chapter 6.3: Governance and Business Models for I-US](#)





Chapter 6.1: Identifying and Prioritizing Synergies

This chapter focuses on the identification and prioritization of I-US opportunities, providing local and regional authorities with methods to move from potential ideas to actionable projects. It presents analytical tools used to evaluate and rank these opportunities, and the digital decision-support solutions such as the SYMSITES IT Regional Management Platform (ITRMP), which supports data integration, stakeholder mapping, and scenario analysis to help authorities identify high-potential regions for symbiosis and make informed strategic decisions.

- Target audience: Local Authorities and Municipalities
- Estimated time: 15 minutes
- Includes: Explanations Tools





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Identifying and Prioritizing Synergies

Identifying and prioritizing synergies is a fundamental step in translating Industrial-Urban Symbiosis (I-US) from a conceptual ambition into concrete actions. In the context of I-US, **synergies refer to potential exchanges of resources (such as water, energy, materials, by-products, infrastructure, or services) between urban and industrial actors** that generate shared economic, environmental, and social value.

For local and regional authorities, the challenge lies not only in detecting these opportunities but also in assessing them systematically in order to focus limited resources on the most promising initiatives. A structured identification and prioritisation process ensures that potential exchanges are aligned with broader sustainability objectives, industrial competitiveness strategies, climate policies, and territorial development goals.

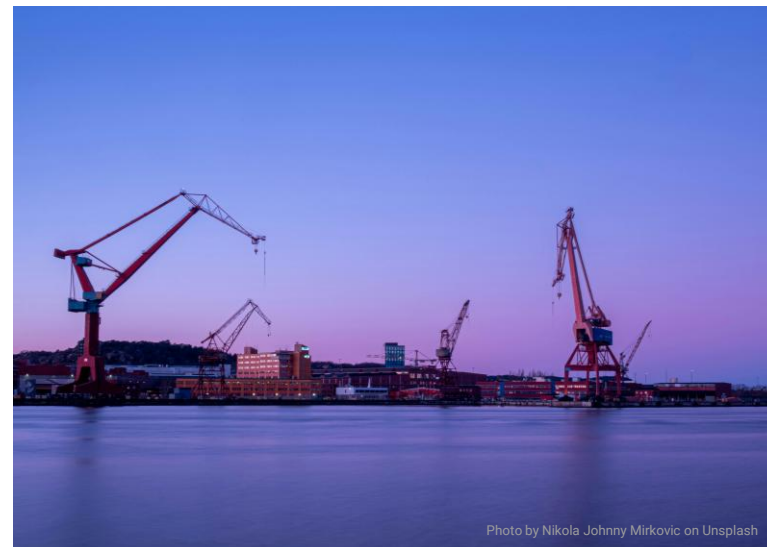


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Identifying and Prioritizing Synergies

Moving from concept to implementation requires authorities to adopt a **structured approach combining territorial analysis, stakeholder engagement, and analytical assessment methods**. This approach generally follows three main steps: identifying potential synergies, evaluating their feasibility and impact, and prioritizing them within a strategic portfolio of initiatives.

The first phase consists of identifying possible resource exchanges between actors operating within a territory. In many regions, opportunities for symbiosis already exist but remain invisible because resource flows are fragmented across different sectors, organisations, or administrative boundaries. Identifying these connections therefore requires a **comprehensive mapping of actors, activities, and material flows**.

Stakeholder mapping and resources and waste stream mapping have been presented in Module 5 of this training course.

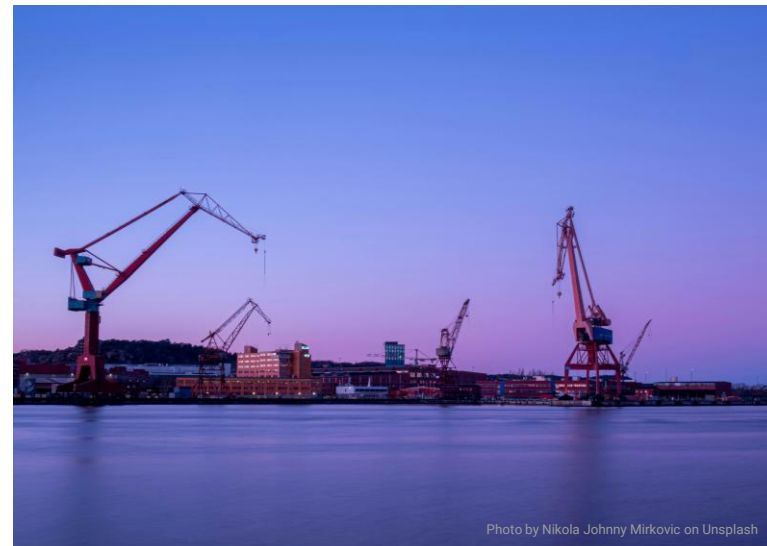


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Identifying and Prioritizing Synergies

After potential exchanges have been identified, the next step is to evaluate their feasibility and potential impacts. Because each potential synergy involves technical, economic, environmental, and organisational considerations, evaluation requires **structured assessment frameworks**.

One commonly applied approach is **Input-Output and Material Flow Analysis (MFA)**, which helps quantify resource inputs and outputs at facility and territorial scales. By comparing these flows, analysts can identify situations where surplus outputs from one actor can serve as inputs for another.

This analysis also supports the assessment of:

- technical compatibility of materials or energy streams
- infrastructure and transport requirements
- economic feasibility and cost savings
- regulatory or permitting constraints

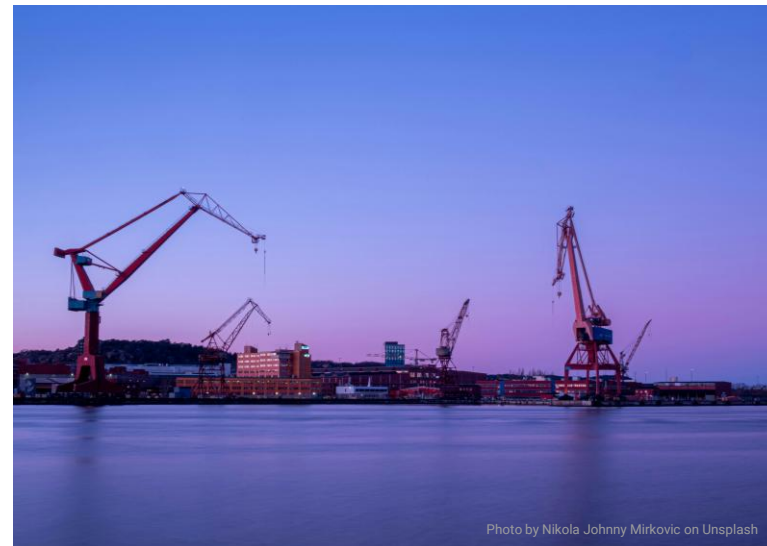


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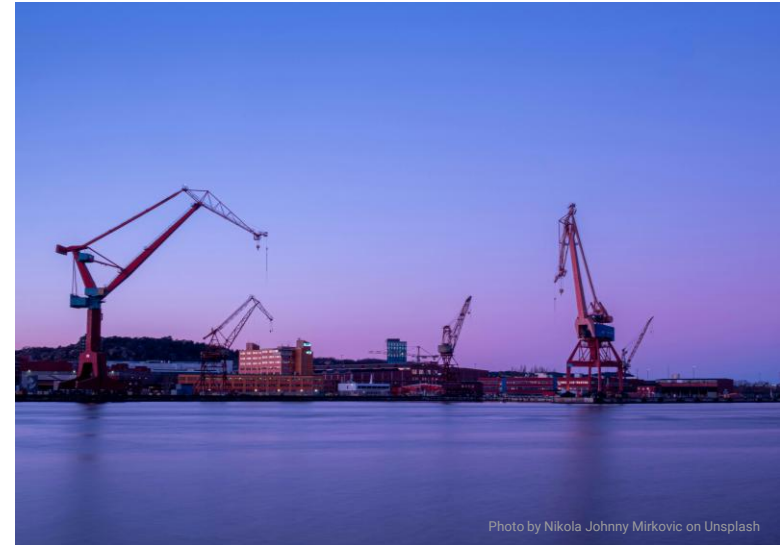


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Identifying and Prioritizing Synergies

In addition to technical analysis, authorities often apply **Multi-Criteria Decision Analysis (MCDA)** to compare different opportunities in a structured way. MCDA frameworks allow decision-makers to assess synergies based on a range of criteria reflecting local priorities. These may include:

- **Economic indicators**, such as operational cost reductions, new revenue streams, or investment requirements.
- **Environmental indicators**, such as greenhouse gas reductions, resource efficiency improvements, or waste diversion from landfills.
- **Social indicators**, including job creation, local economic resilience, or improved urban services.





Identifying and Prioritizing Synergies

Within an MCDA framework, stakeholders can assign weights to different criteria depending on strategic priorities, for example placing greater emphasis on climate mitigation within a regional decarbonisation strategy. Each potential synergy is then scored across the selected indicators, allowing authorities to compare and rank options objectively.

Another important dimension of evaluation is **readiness and risk assessment**. Even when a synergy appears promising, barriers such as technological maturity, regulatory uncertainty, or limited stakeholder commitment may hinder implementation. Tools such as **Symbiosis Readiness Level matrices** help determine whether the conditions required for collaboration are already in place or require further development.

The result of this evaluation process is **a structured list of potential synergies, characterized by their feasibility, expected impacts, and risk levels**.

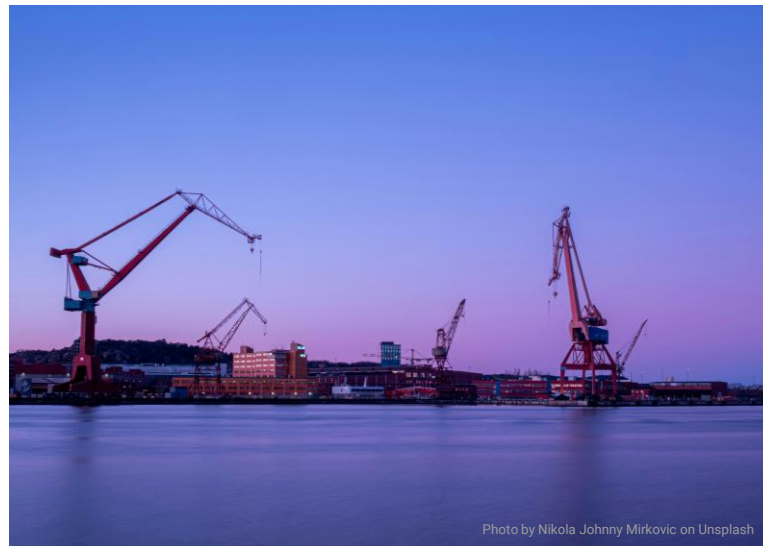


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Tool: Symbiosis Readiness Level

The **Symbiosis Readiness Level (SRL)** tool is an assessment framework used to evaluate how prepared a territory, organization, or partnership is to develop and implement **IS and I-US** initiatives. It provides a structured way for public authorities, companies, and facilitators to determine the maturity of potential symbiotic collaborations and identify the steps needed to move from early exploration to fully operational exchanges.

The concept is inspired by other maturity frameworks, such as Technology Readiness Levels (TRL), but it focuses specifically on the **organizational, technical, economic, and governance conditions required for symbiosis projects**. By assessing these dimensions, the SRL tool helps stakeholders understand whether a proposed exchange is still conceptual, in preparation, or ready for implementation.

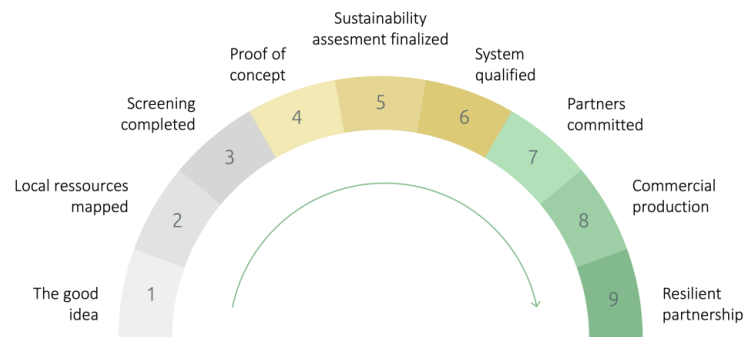


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Tool: Symbiosis Readiness Level

Purpose of the SRL Tool

The Symbiosis Readiness Level tool supports decision-making by helping authorities and stakeholders:

- **Assess the maturity of potential symbiosis opportunities**
- **Identify barriers to collaboration**, such as technical incompatibilities or regulatory constraints
- **Prioritize initiatives** that are ready to move toward implementation
- **Plan targeted interventions** to increase readiness where gaps exist

For public authorities, SRL assessments are particularly useful during the **prioritization phase**, when multiple potential exchanges have been identified and need to be evaluated based on feasibility and readiness.

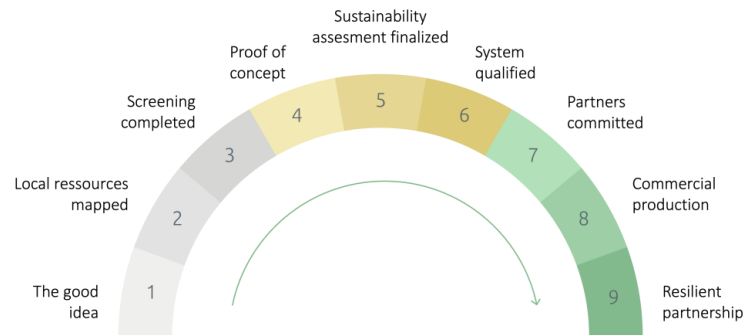


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Tool: Symbiosis Readiness Level

Key Dimensions Assessed

The SRL framework typically evaluates readiness across several interconnected dimensions:

Technical readiness

Assesses whether the technologies needed to enable the resource exchange exist and are sufficiently mature. This includes compatibility between waste streams and technologies, infrastructure availability, and operational feasibility.

Economic readiness

Evaluates whether the proposed exchange is financially viable, considering factors such as investment costs, operational costs, potential savings, and market demand for recovered resources.

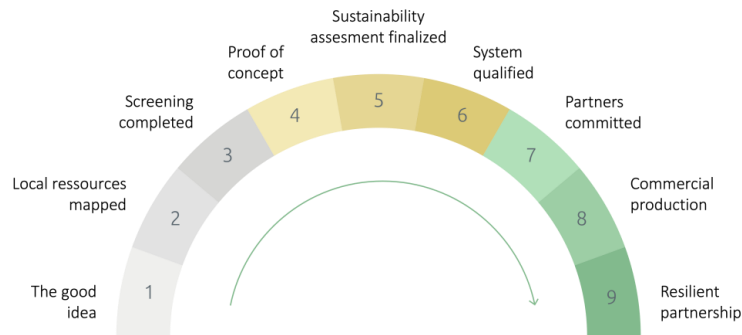


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Tool: Symbiosis Readiness Level

Organizational readiness

Examines the willingness and capacity of stakeholders to collaborate. This includes trust between actors, clarity of roles and responsibilities, and the presence of coordination mechanisms.

Regulatory and institutional readiness

Assesses whether existing regulations allow the exchange to occur and whether permitting processes, standards, or policies could pose barriers.

Infrastructure and logistical readiness

Considers whether physical infrastructure—such as pipelines, transport networks, treatment facilities, or storage systems—is available or can be developed.

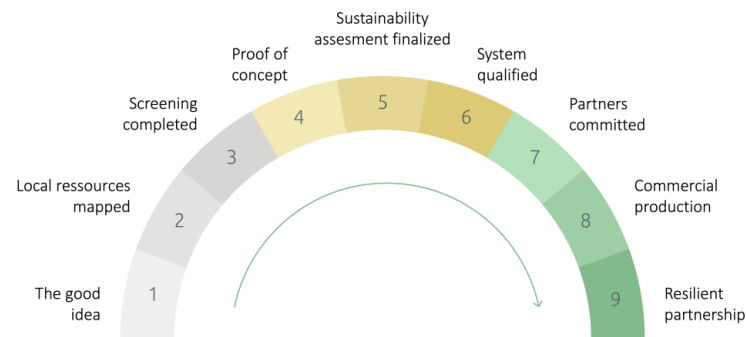


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Tool: Symbiosis Readiness Level

Typical Readiness Levels

Although the exact structure may vary between methodologies, SRL frameworks generally describe a **progressive scale of maturity**, for example:

- **Concept identification:** Potential symbiosis opportunities are identified but not yet analysed.
- **Preliminary feasibility:** Basic technical and economic assessments are conducted.
- **Stakeholder engagement:** Relevant actors are identified and discussions begin.
- **Detailed feasibility assessment:** Technical, regulatory, and financial analyses are carried out.

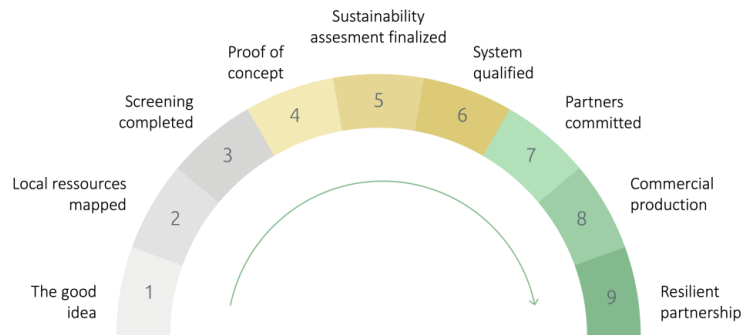


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Tool: Symbiosis Readiness Level

- **Pilot or demonstration stage:** Small-scale testing or pilot projects are implemented.
- **Operational implementation:** The symbiosis exchange is fully implemented and functioning.

This staged approach helps stakeholders understand what actions are needed to move from one level to the next.

Within the broader Industrial-Urban Symbiosis planning cycle, the Symbiosis Readiness Level tool is typically applied **after potential synergies have been identified and before final prioritization and investment decisions are made**. It acts as a bridge between opportunity mapping and project implementation by providing a structured evaluation of feasibility and maturity.

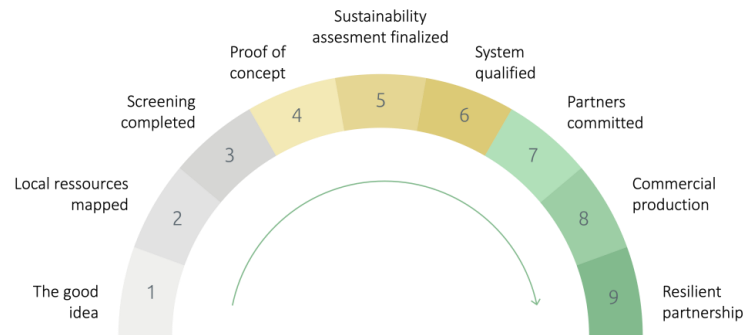


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Tool: Symbiosis Readiness Level

Benefits for Local and Regional Authorities

For local authorities, the SRL tool provides several advantages:

- **Prioritization support:** Authorities can focus resources on opportunities with higher readiness levels or clear pathways to implementation.
- **Barrier identification:** The tool highlights specific technical, economic, or regulatory obstacles that must be addressed.
- **Project monitoring:** SRL assessments can be repeated over time to track progress as initiatives move toward implementation.
- **Strategic planning:** The framework helps authorities design targeted policies, infrastructure investments, or facilitation actions that increase readiness across the local ecosystem.

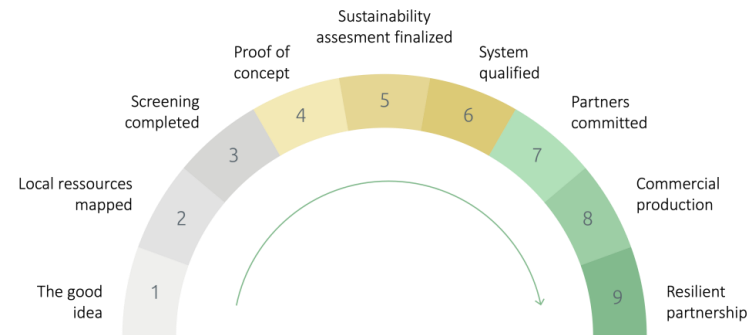


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Want to learn more?

- Read this: [European Commission: Directorate-General for Research and Innovation - Study and portfolio review of the projects on industrial symbiosis](#)





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Identifying and Prioritizing Synergies

Prioritization and Strategic Decision-Making

Once synergies have been evaluated, authorities must determine which initiatives should be pursued first. Prioritisation is essential because implementing symbiosis projects often requires significant investments in infrastructure, coordination, and governance.

A key step in prioritisation is **aligning potential projects with broader strategic objectives**, such as circular economy strategies, climate neutrality targets, industrial competitiveness policies, or urban development plans. Synergies that contribute to multiple policy objectives are often considered particularly valuable.

Authorities may also distinguish between **short-term “quick wins”** and **longer-term strategic projects**. Quick wins are typically exchanges that require limited infrastructure investments and involve partners that are already willing to collaborate.

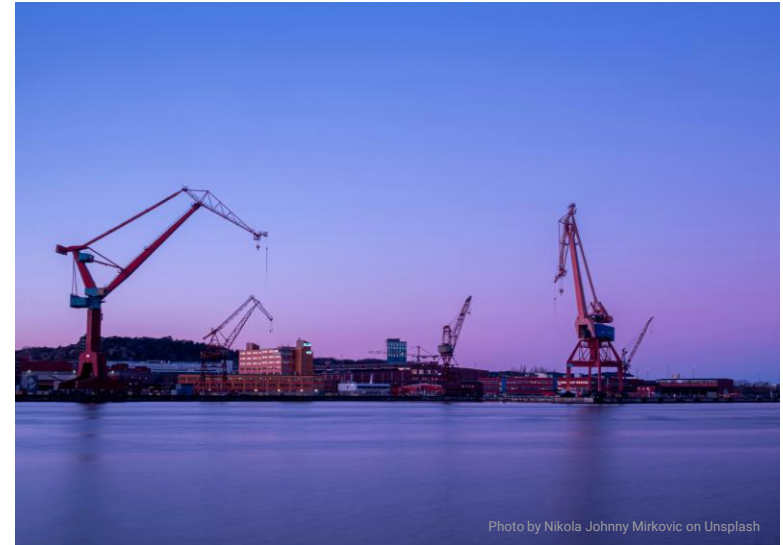


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Identifying and Prioritizing Synergies

These projects can demonstrate the value of I-US and build momentum for more complex initiatives in the future. Long-term projects, in contrast, may involve larger infrastructure investments, regulatory changes, or new technological solutions.

Stakeholder validation is also an essential part of prioritisation. Results from the evaluation process are often presented through **stakeholder workshops, collaborative platforms, or consultation processes**, allowing actors to discuss feasibility, refine assumptions, and confirm interest in collaboration. This process helps ensure that priority projects are realistic and supported by key partners.

The final outcome is **a prioritized portfolio of I-US initiatives**, which can then move forward to feasibility studies, pilot projects, or full-scale implementation.

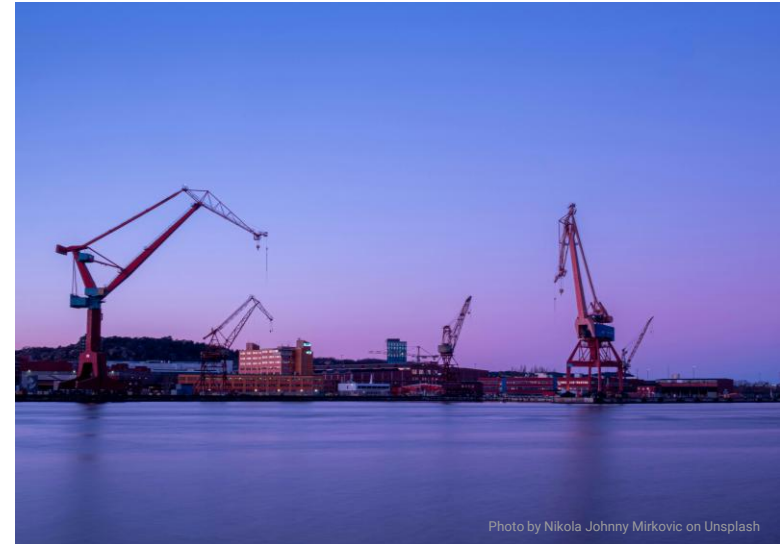


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Industrial-Urban Symbiosis

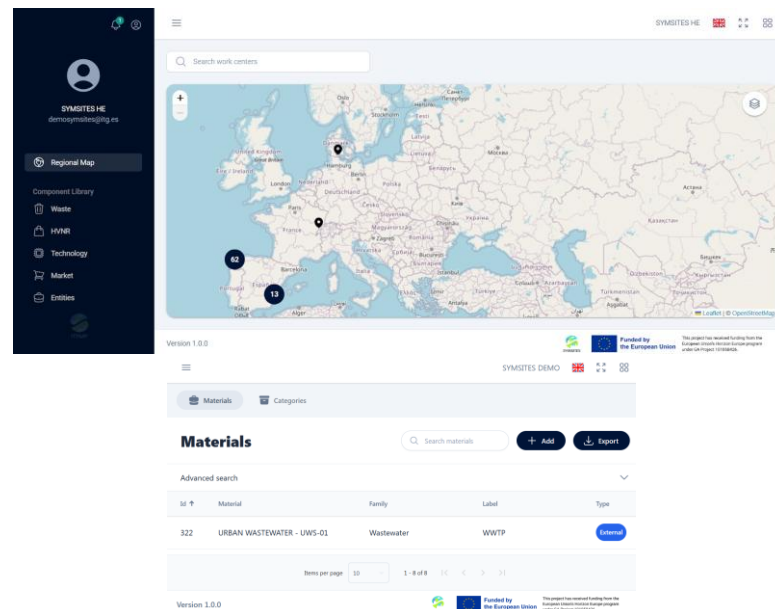
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Digital Decision Support: The SYMSITES ITRMP Platform

Digital tools can significantly strengthen the identification and prioritisation of symbiosis opportunities by integrating large datasets, enabling spatial analysis, and supporting collaboration between stakeholders. Within the SYMSITES project, such capabilities are provided through the **IT Regional Management Platform (ITRMP)**.

The ITRMP platform was developed as a digital decision-support system to assist local and regional authorities in **planning, analysing, and managing industrial-urban symbiosis initiatives**. It integrates several analytical modules that support the identification, characterisation, and mapping of stakeholders and resource flows across a territory.

Within the SYMSITES project, a set of digital tools was designed and implemented by ITG to support the **identification, characterization, and mapping of key stakeholders involved in industrial-urban symbiosis strategies**.



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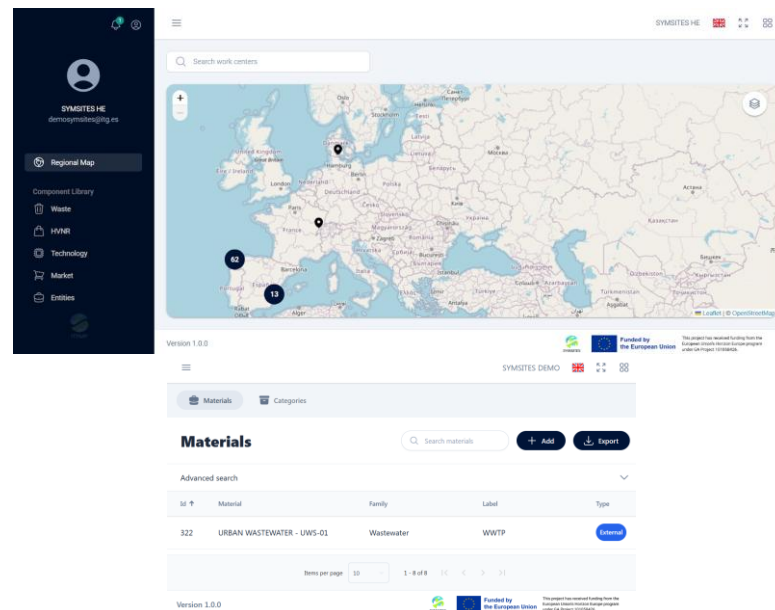
Digital Decision Support: The SYMSITES ITRMP Platform

The platform allows users to register information about actors operating in the territory according to three key roles within the I-US ecosystem:

- actors **generating waste or surplus resources**,
- actors **providing technologies for waste valorisation**, and
- actors **consuming the new resources generated through valorisation processes**.

For each role, the platform also records **associated material and energy flows**, providing a detailed overview of potential exchanges across the local system.

The digital tool can be used both by **public administrations and private industrial actors**. By collecting and organising information on stakeholders, activities, and flows, the platform creates a structured database of interactions within the territory. Importantly, it also stores **geographic information on where stakeholders operate**, allowing spatial analysis of resource exchanges.



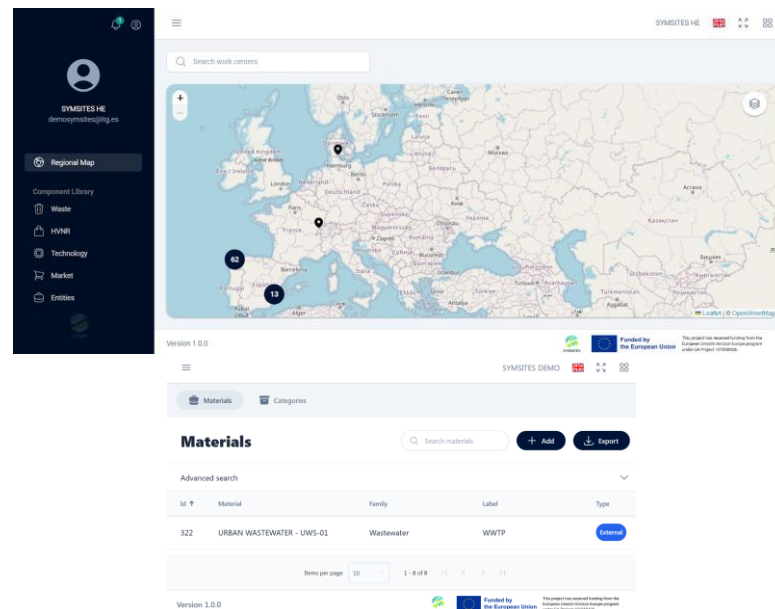
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Digital Decision Support: The SYMSITES ITRMP Platform

This spatial dimension is implemented through the **Industrial-Urban Symbiosis Map (IUSM)** module. The IUSM enables the visual mapping of stakeholders, technologies, and resource flows, making it possible to identify **regions with high potential for establishing industrial-urban symbiosis**. Clusters of activities, proximity between producers and users of resources, and existing infrastructure networks can all be analysed visually.

These high-potential regions can then be explored under **different scenarios**, allowing authorities to assess how various strategies might influence resource flows, environmental impacts, or economic outcomes. Scenario analysis enables planners to evaluate alternative configurations—for example, introducing new waste valorisation technologies, connecting industrial heat sources to district heating networks, or establishing shared treatment facilities.





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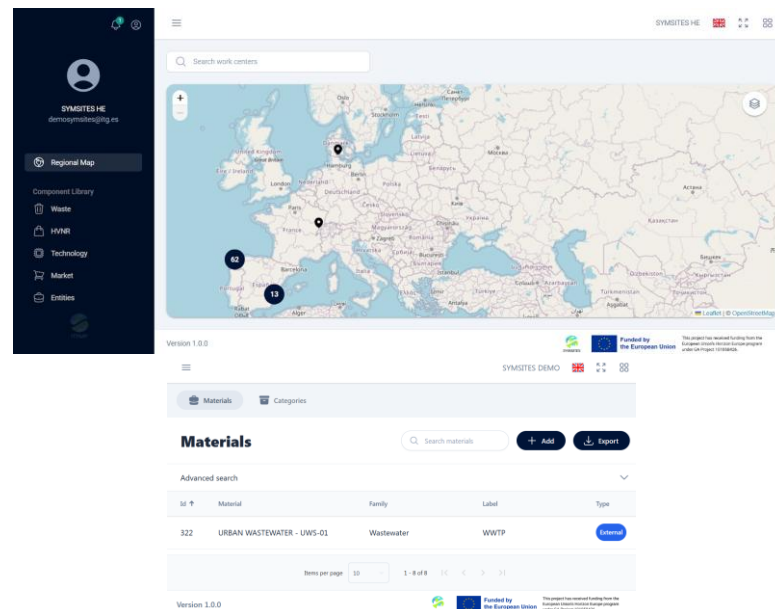
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Digital Decision Support: The SYMSITES ITRMP Platform

Beyond the mapping module, the ITRMP platform also includes additional functionalities supporting the development and monitoring of symbiosis initiatives:

- **Smart Matchmaking (MATCH)** modules help identify compatible exchanges between stakeholders based on resource characteristics and technological requirements.
- **Smart Monitoring, Control and Optimization (SMCO)** modules support the monitoring and optimisation of operational resource flows once symbiosis projects are implemented.
- **Social Decision Support (κ -SDSS)** tools integrate social indicators such as employment, community impact, or quality of life into decision-making processes.



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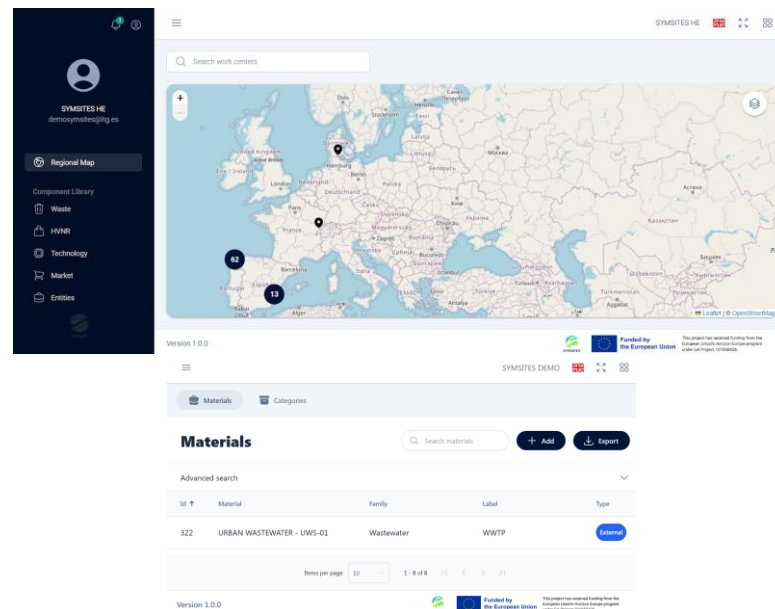
Together, these functionalities provide **local authorities, urban planners, and policymakers with powerful analytical tools** for guiding strategic planning, resource management, and governance of industrial-urban ecosystems.

Specifically, these are the benefits for Local and Regional Authorities using the platform:

Strategic Planning

ITRMP provides a strong analytical basis for long-term planning and investment decisions related to I-US.

- **Quantitative regional assessment:** The **IUSM module** maps regional resources (waste streams), technologies for transformation, and market opportunities, providing evidence for strategic goal setting.



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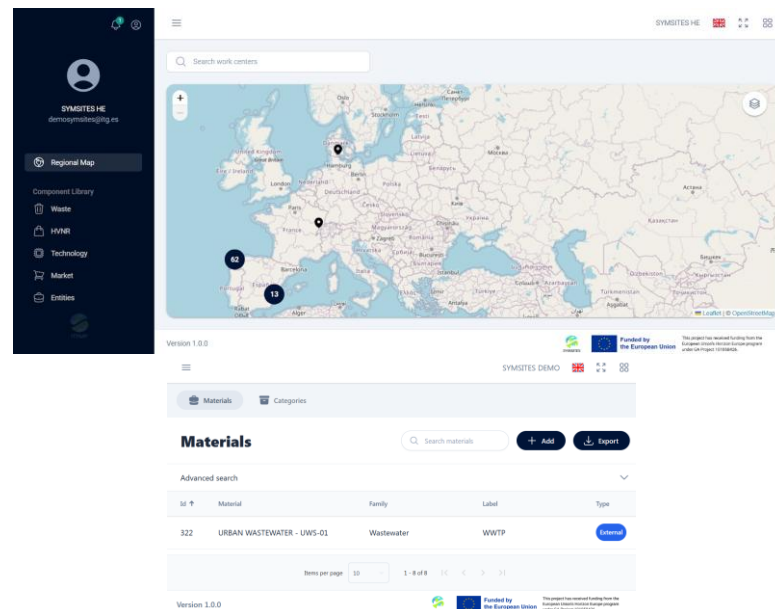
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Digital Decision Support: The SYMSITES ITRMP Platform

- **Multi-dimensional impact assessment:** Environmental, economic, and social impacts can be assessed together, allowing authorities to evaluate trade-offs between sustainability objectives.
- **Understanding system dynamics:** Simulation tools help explore how I-US initiatives may influence economic and social systems over time.
- **Value chain visibility:** Combining data from **IUSM** and **MATCH** reveals potential regional value chains, identifying strengths, gaps, and areas needing policy support.
- **Improved long-term planning and investment decisions:** Targeted infrastructure development (e.g., collection networks or treatment facilities); Alignment with social policies such as workforce training or community engagement; More efficient allocation of public resources to high-impact initiatives; Scenario modelling to test strategies against future changes in technology, markets, or policy priorities



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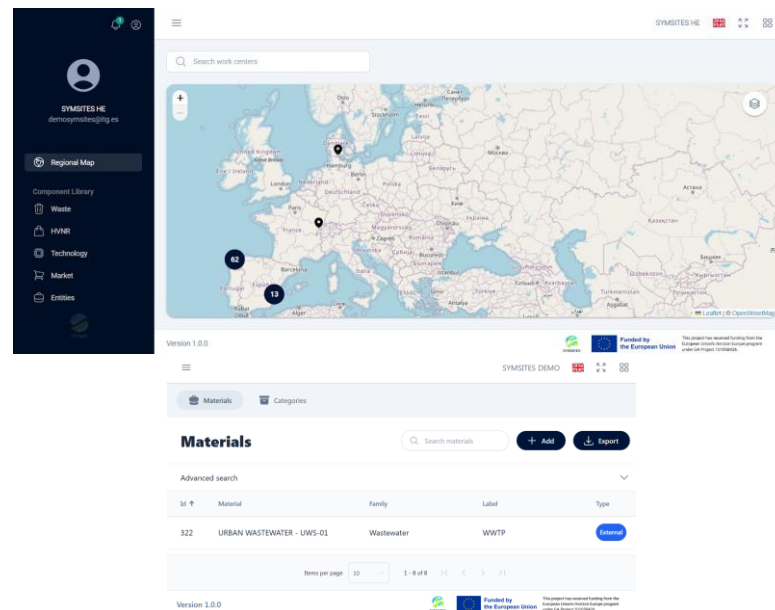


Digital Decision Support: The SYMSITES ITRMP Platform

Operational Efficiency

ITRMP streamlines administrative processes and enables faster, more responsive decision-making.

- **Centralized information hub:** Consolidates data on stakeholders, waste streams, technologies, markets, and locations into one platform.
- **Rapid scenario exploration:** Simulation tools allow authorities to quickly analyse different I-US strategies and policy interventions.
- **Focused policy analysis:** The system enables targeted studies on specific social or environmental issues linked to I-US initiatives.
- **Market insights:** The **MATCH module** helps identify potential industrial collaborations and market readiness for resource exchanges.



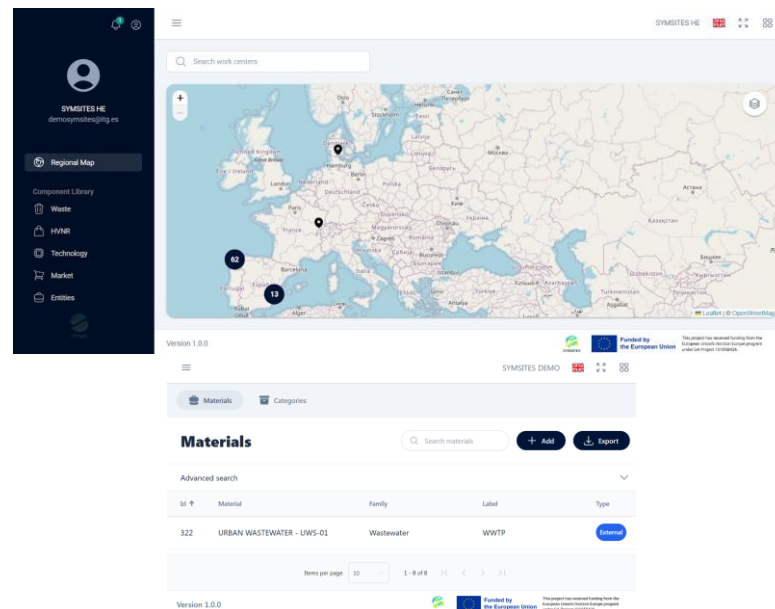


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Digital Decision Support: The SYMSITES ITRMP Platform

This supports greater responsiveness by enabling authorities to:

- **Anticipate challenges**, such as social impacts or infrastructure constraints.
- **Adapt to emerging opportunities**, including new technologies or resource streams.
- **Improve operational oversight**, with potential access to aggregated monitoring data from operational systems.



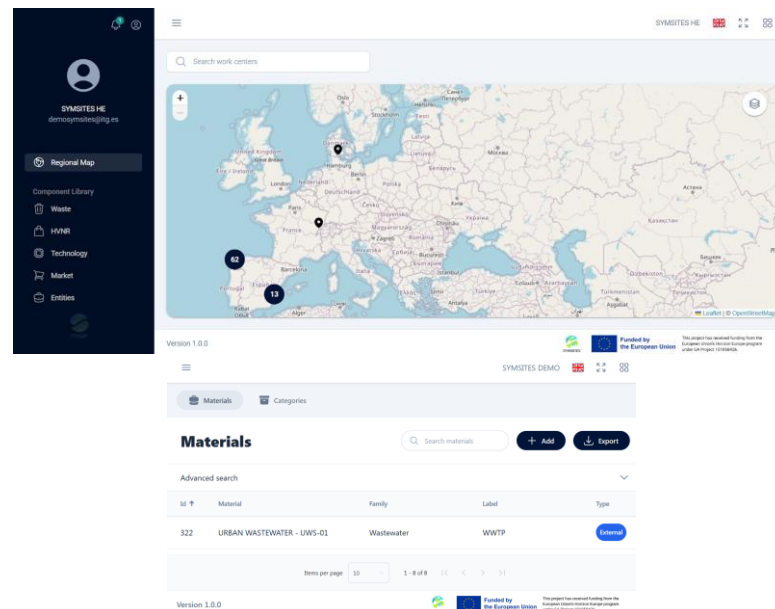


Digital Decision Support: The SYMSITES ITRMP Platform

Compliance and Transparency

ITRMP strengthens governance by supporting regulatory compliance and improving transparency.

- **Alignment with spatial and environmental plans:** Mapping and scenario analysis ensure I-US projects are consistent with land-use and environmental regulations.
- **Proactive social risk management:** Social analysis tools help evaluate impacts on employment, equity, and community wellbeing.
- **Support for compliance monitoring:** Operational data can assist authorities in verifying environmental performance where regulatory access exists.





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Digital Decision Support: The SYMSITES ITRMP Platform

ITRMP also **enhances public trust** by enabling:

- **Evidence-based decision making**, supported by clear analytical results.
- **Improved communication**, using maps, scenario comparisons, and simulation outputs to explain policy choices.
- **Transparency in social impact considerations**, through structured analysis frameworks.
- **Clearer stakeholder communication**, thanks to standardized terminology and data structures.



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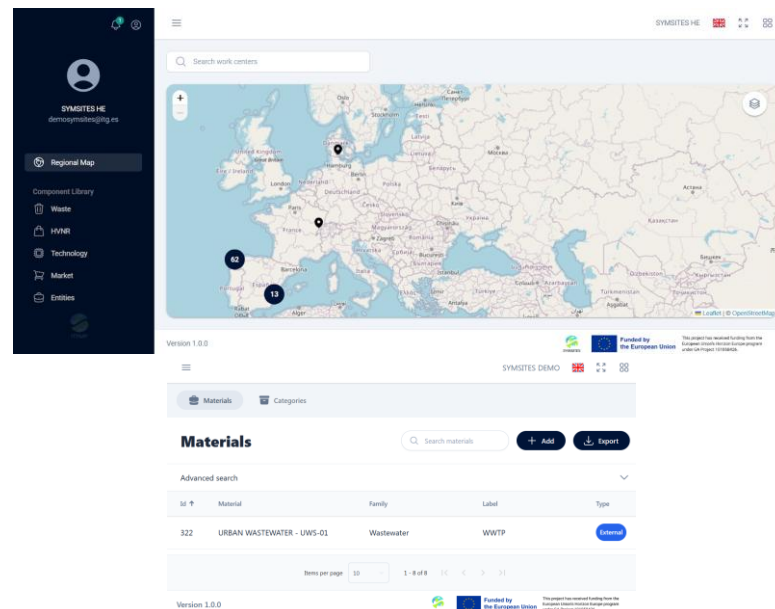
Digital Decision Support: The SYMSITES ITRMP Platform

By combining spatial mapping, resource flow analysis, and scenario modelling, the platform supports evidence-based decision-making and helps authorities identify the most promising pathways for circular development.

Ultimately, the ITRMP platform aims to **facilitate more efficient resource use, strengthen collaboration between stakeholders, and support the transition toward circular economy models at the territorial level.**

Want to learn more?

- Read this: SYMSITES – [D3.4 Best Practice Guidelines for Public Authorities: needs and solutions for system implementation](#)



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Chapter 6.2: Embedding I-US in Local Strategies

This chapter explores how local and regional authorities can integrate I-US into broader circular economy and sustainability strategies, by guiding on entry points across multiple policy areas and aligning them with local priorities. It highlights both territorial-level approaches, like city-wide or regional strategies, and targeted, site-specific initiatives.

- Target audience: Local Authorities and Municipalities
- Estimated time: 15 minutes
- Includes:

Explanations

Case Studies

Exercises





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Why is it important to embed in strategies?

Industrial-Urban Symbiosis rarely emerges by accident. While individual exchanges between companies can happen opportunistically, sustained and scalable I-US requires a strategic framework that provides direction, legitimacy and continuity.

Strategies help translate long-term political or organisational ambitions into concrete priorities, align different departments and actors around shared goals, and create a stable environment for cooperation, investment and experimentation. For municipalities and regions in particular, strategies signal commitment: they make I-US visible as a policy objective, help justify resource allocation, and offer guidance to public utilities, planners, companies and intermediaries on where collaboration is encouraged.



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Why is it important to embed in strategies?

At the same time, strategies do not need to be highly technical or overly prescriptive to be effective. Their main value lies in setting a common narrative, defining focus areas, and creating interfaces between sectors that would otherwise operate in isolation.

For I-US, this means connecting industrial activity with urban systems such as energy, water, waste, land use and infrastructure, and embedding symbiosis thinking into existing policy frameworks rather than treating it as a standalone niche topic.



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Why is it important to embed in strategies?

Strategic entry points for I-US

I-US can be addressed through different types of strategies, each offering a distinct perspective and leverage point.

- **Circular Economy strategies** are the most common entry point, as they explicitly aim to keep resources in use, valorise by-products and promote cross-sector collaboration.
- **Urban planning and spatial strategies** can integrate I-US by considering the co-location of industries, utilities and residential areas, safeguarding land for circular infrastructure, or planning heat, water and material networks.
- **Economic development and innovation strategies** can support I-US by strengthening industrial clusters, supporting pilot projects, and attracting investment in valorisation technologies.



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Why is it important to embed in strategies?

- **Energy and climate strategies** often provide another strong anchor, particularly where waste heat recovery, renewable integration or industrial decarbonisation are priorities. In practice, the strongest I-US frameworks tend to emerge where several of these strategies reinforce each other.

In practice, the most effective frameworks emerge where multiple strategies intersect and reinforce each other, creating a coherent policy environment that supports I-US from different angles.



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Concrete examples: Strategies with an I-US perspective

Recent circular-economy strategies illustrate how I-US can be embedded at different territorial levels.

At the city level, the **new Circular Economy Strategy of the City of Munich** positions symbiosis as one of the levers to address circularity needs between companies. Also, the **Vitoria-Gasteiz 2030 Strategy to Drive the Circular Economy** and its Action Plan 2024-2027 include a strong focus on industrial ecology and symbiosis, including analysing possible collaborative systems based on industrial symbiosis and forging agreements with other administrations to obtain data on potential industrial symbiosis opportunities.





Concrete examples: Strategies with an I-US perspective

At a regional level, the **Circular Economy Strategy of Päijät-Häme (Finland)** represents a more long-term, practice-oriented approach. The region has built its strategy around industrial symbiosis as a driver of economic development, innovation and sustainability, supported by mapping of material flows, strong cooperation between industry and public actors, and dedicated facilitation structures. This example shows how a clear strategic focus can help institutionalise I-US over time and turn it into a core regional competence.

Together, these examples demonstrate that strategies do not need to follow a single template to support I-US. What matters most is that they provide orientation, connect sectors and actors, and create a shared framework within which industrial-urban symbiosis can move from isolated projects to a recognised element of urban and regional development.



2030 STRATEGY TO DRIVE
THE CIRCULAR ECONOMY
IN VITORIA-GASTEIZ

Action Plan 2024-2027





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I-US Strategies for Specific Initiatives

In addition to city-wide or regional strategies, I-US can also be guided by **more targeted, lower-level strategies** developed for specific hubs, eco-industrial parks or implementation-oriented initiatives. These strategies typically focus on a defined geographic area or group of actors and translate broader policy goals into concrete operational actions, such as shared infrastructure, resource exchanges or governance arrangements within a site.

While they can be highly effective in accelerating implementation and testing solutions, their scope is necessarily narrower and strongly shaped by local conditions, existing industries and infrastructure. It is therefore important to distinguish these context-specific strategies from overarching municipal or regional frameworks, which provide broader direction and coordination across multiple sectors and territories.



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Exercise – Reflection: Embed I-US in your local strategies

This exercise will help you reflect on how to integrate I-US into existing strategies in your municipality or region.

Instructions:

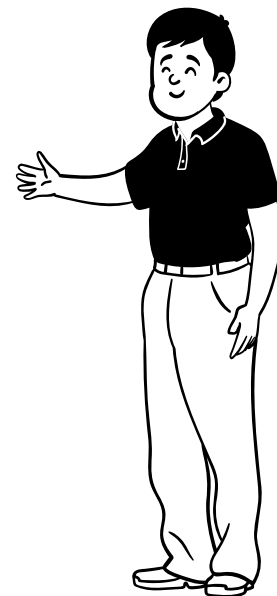
Use your knowledge of local policies, urban planning, and industrial areas to complete the sections below. Think practically about what is feasible and how to align initiatives with long-term circular economy and sustainability objectives.

Part 1: Identify Strategic Opportunities

List the **existing strategies and policies** in your area that relate to:

- Circular economy
- Urban planning or spatial development
- Economic development or innovation
- Energy or climate initiatives

For each strategy, describe **how I-US could complement or strengthen it**, and identify potential resource exchanges (materials, energy, water, by-products).





Exercise – Reflection: Embed I-US in your local strategies

Part 2: Select a Target Area

Choose an **industrial zone, eco-industrial park, or urban district** where I-US could be implemented. Identify:

- Key industries and urban systems in the area
- Potential resource flows that could be valorized
- Key stakeholders (companies, utilities, public agencies, intermediaries)

Part 3: Assess Readiness

Evaluate the **readiness of potential symbiosis opportunities**:

- Technical feasibility
- Economic viability
- Social impacts
- Regulatory or logistical constraints





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Exercise – Reflection: Embed I-US in your local strategies

Part 4: Propose Strategic Actions

Suggest **three actions** to embed I-US in your local context:

- **Policy-level:** How could I-US be integrated into municipal or regional strategies?
- **Initiative-level:** Site-specific actions, pilot projects, or infrastructure investments.
- **Stakeholder engagement:** Methods to involve companies, utilities, and public actors, including partnerships or data-sharing agreements.

Part 5: Reflection

Consider how your proposed actions:

- Support circular economy and sustainability objectives
- Promote cross-sector collaboration
- Balance quick wins with long-term systemic change

Identify **key challenges and opportunities** and suggest how progress could be monitored over time.





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Chapter 6.3: Governance and Business Models for I-US

This chapter examines effective governance and strategic business models for I-US long term sustaining. It presents different governance models and structured governance arrangements, as well as advantages and disadvantages associated with certain models to finance the activities of the governance structures. In addition, the chapter dives into operational, managerial, or hybrid business models for circular hubs and I-US initiatives, linking infrastructure, facilitation services, and knowledge networks to sustainable revenue streams.

- Target audience: Local Authorities and Municipalities
- Estimated time: 15 minutes
- Includes: Explanations





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Governance Structures for I-US Collaboration

Governance models play a central role in turning Industrial-Urban Symbiosis from isolated exchanges into stable, repeatable and scalable systems. Because I-US is highly context-specific, no single governance model fits all situations; instead, a range of forms has emerged depending on local institutional structures, economic profiles and policy traditions.

Common models include industrial symbiosis hubs, clusters, eco-industrial parks, ports, digital matchmaking platforms and formal or informal networks. While these differ in structure and scope, they share a common purpose: **providing an organisational framework that enables coordination, reduces transaction costs and supports long-term collaboration among diverse actors.**



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Governance Structures for I-US Collaboration

Formalising I-US through such governance models brings several advantages. It creates structure and continuity, moving symbiosis beyond ad-hoc initiatives toward sustained activity.

A defined governance body provides mandate, ownership and responsibility, clarifying who coordinates exchanges, manages data, facilitates engagement and represents the initiative externally. Formal structures also help build trust and credibility, as stakeholders can relate to a recognised organisation rather than an abstract idea or temporary project. By giving I-US a clear “face”, governance models make it easier to attract participants, secure funding, engage policymakers and communicate progress. Importantly, they also enable scaling and replication, allowing successful practices to expand geographically or across value chains.



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Governance Structures for I-US Collaboration

In practice, most successful I-US governance models rely on a mix of actors (public authorities, utilities, companies, facilitators and research organisations) each contributing complementary capabilities. Designing governance with this diversity of stakeholder collaboration in mind is essential to ensure that strategic direction, technical expertise, operational capacity and stakeholder engagement are all adequately covered.





Governance Structures for I-US Collaboration

Governance Models for Circular Hubs

Developing a circular hub requires a strong, clearly defined governance structure to coordinate heterogeneous actors and align activities with broader policy objectives. European experience demonstrates several governance models, each adapted to context and hub objectives:

- **Non-legal association of diverse actors** – Members participate collectively, often taking facilitation roles.
- **Public legal entity** – Operates within a regional government, aligning fully with policy but with limited operational autonomy (e.g., Helsingborg).
- **Private, non-profit legal entity** – Offers autonomy with a dedicated team that actively promotes industrial symbiosis practices.



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Governance Structures for I-US Collaboration

- **Private entity managing infrastructure under dual governance** – One organization owns infrastructure while another coordinates innovation and symbiosis facilitation (e.g., Skive).
- **Public-private partnership with its own legal identity** – Combines resources and expertise across sectors.
- **Coalition of private industrial companies** – Founding members of a steering committee manage and coordinate the hub collectively (e.g., Zaragoza).



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Governance Structures for I-US Collaboration

Circular hubs and I-US initiatives rely on **structured governance arrangements** to coordinate multiple stakeholders, ensure strategic alignment, and facilitate collaboration across sectors. While the exact structure varies depending on the hub's size, objectives, and context, most successful hubs include a combination of the following operational bodies:

- **Steering Committee:** This body provides the hub's **overall strategic direction and oversight**. It is typically composed of senior representatives from key member organizations, including public authorities, industrial partners, and research institutions. The steering committee defines priorities, approves major initiatives, monitors progress against objectives, and ensures that activities remain aligned with the hub's long-term vision. In some hubs, it also mediates conflicts, allocates resources, and approves new membership applications. **Hub types and typical business models:**





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Governance Structures for I-US Collaboration

- **Advisory Board:** The advisory board serves as an **external source of expertise and guidance**, offering insights that complement the hub's internal decision-making. Members are often selected for their technical proficiency, sector-specific knowledge, or policy experience. While their recommendations are non-binding, the advisory board helps the hub anticipate risks, identify emerging opportunities, and integrate best practices from other regions or industries. Their input is particularly valuable when evaluating innovative projects, complex technical solutions, or regulatory compliance challenges.
- **Facilitator or Hub Coordinator:** The facilitator plays a **central operational role** in managing communication, coordinating activities, and maintaining engagement across all hub members. This role requires **neutrality and impartiality**, as the facilitator ensures fair participation, fosters trust among stakeholders, and mediates differing interests.



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Governance Structures for I-US Collaboration

- In addition to organizing meetings and workshops, the facilitator often supports matchmaking between resource providers and users, manages knowledge sharing platforms, and tracks ongoing projects to ensure accountability.
- **Committees or Task Forces:** These are **focused working groups** formed around specific themes, sectors, or projects. Committees may address technical topics such as waste valorisation, energy recovery, or water management, or focus on operational matters like logistics, infrastructure planning, or regulatory alignment. Task forces typically have a clear **mandate and timeframe**, bringing together relevant stakeholders to develop proposals, implement initiatives, or evaluate pilot projects. Their work feeds directly into the strategic decisions of the steering committee and is often critical for operationalizing symbiosis opportunities.



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Governance Structures for I-US Collaboration

Additional Considerations:

Role Diversity and Expertise: Effective hubs balance technical expertise, operational capacity, policy insight, and stakeholder engagement, to ensure that strategic, social, and economic objectives are considered.

Flexibility and Adaptation: Governance structures should be **adaptive**, allowing committees, task forces, or even the steering committee itself to evolve as the hub grows, new members join, or operational needs change.

Transparency and Accountability: Clear roles, documented processes, and structured reporting mechanisms help maintain transparency, build credibility, and foster trust among all participants.

Integration with External Stakeholders: Some hubs include **liaison roles** to interact with regional authorities, national agencies, and other hubs, ensuring alignment with wider policies, funding mechanisms, and regulatory frameworks.



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Governance Structures for I-US Collaboration

Governance structures for I-US require a stable business model to operate, coordinate stakeholders and deliver value over time. In practice, these structures are funded through a mix of approaches, each with specific strengths and limitations.

Project-based funding

- Activities financed through time-limited projects (e.g. EU, national or regional programmes).
- *Advantages:* Enables experimentation and innovation; relatively accessible starting point; low financial risk for participants.
- *Disadvantages:* Limited continuity; risk of stopping when funding ends; focus often shaped by funder priorities rather than long-term needs.



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Governance Structures for I-US Collaboration

Public funding (core or operational funding)

- Ongoing support from municipalities, regions or public agencies.
- *Advantages:* Provides stability and legitimacy; aligns with public policy objectives; enables long-term planning and coordination.
- *Disadvantages:* Dependence on political cycles and budgets; potential administrative constraints; limited flexibility in some contexts.

Fee-based or membership models

- Companies or organisations pay membership fees or service charges to participate.
- *Advantages:* Encourages commitment and ownership; market-oriented; reduces reliance on public funding.
- *Disadvantages:* Entry barriers for smaller actors; may exclude early-stage participants; requires clear value proposition.





Governance Structures for I-US Collaboration

Service-based or performance-based models

- Revenue generated through specific services (e.g. matchmaking, studies, facilitation, data access).
- *Advantages:* Direct link between value delivered and income; scalable; incentivises efficiency and results.
- *Disadvantages:* Harder to apply in early phases; income can be volatile; may prioritise short-term deliverables.

Private funding or sponsorship

- Support from private companies, foundations or donors.
- *Advantages:* Flexible funding; faster decision-making; suitable for pilots and niche initiatives.
- *Disadvantages:* Dependence on individual interests; potential conflicts of interest; limited long-term security.



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Governance Structures for I-US Collaboration

Getting to a suitable business model is typically an iterative process rather than a one-off decision. Tools such as business model canvases can help governance structures clarify their value proposition, key activities, stakeholders, cost structure and potential revenue streams in a structured yet flexible way. Visioning and scenario exercises are equally useful to align actors around a shared long-term ambition and to explore how the governance model might evolve from an early, project-based setup into a more stable and diversified structure.

Starting simple, testing assumptions in practice, and gradually refining the model based on real experience allows I-US initiatives to balance ambition with realism while building a sustainable foundation for long-term operation.



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Developing a Circular Hub Business Model

For long-term viability, a hub must operate under a **coherent business model** defining how it creates, delivers, and captures value. Business model design is shaped by:

- The governance structure of the hub
- The nature of its activities (operational, managerial, or hybrid)
- The type of impact it seeks to generate

Key components of I-US hub business models:

- **Value Proposition:** Defines the benefits the hub provides to its members and stakeholders, including access to shared infrastructure, facilitation of resource exchanges, technical and business expertise, networking opportunities, and strategic guidance.





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Developing a Circular Hub Business Model

- **Value Creation and Delivery:** Describes how the hub organizes resources, partnerships, processes, and operations to deliver these benefits effectively. It may include infrastructure management, matchmaking services, technical support, training, and monitoring of environmental or social impacts.
- **Value Capture Mechanisms:** Identifies the revenue streams and financial strategies that allow the hub to sustain itself over time.





Developing a Circular Hub Business Model

Types of Circular Hub Business Models

1. Operational Hubs:

- **Focus:** Own or manage physical infrastructure such as industrial parks, utilities, treatment facilities, pipelines, or shared logistics networks.
- **Value Proposition:** Infrastructure-based, enabling material, energy, or water exchanges among hub members.
- **Orientation:** Defensive: Focus on regulatory compliance, e.g., reducing waste, meeting emissions standards. or Accommodative: Broader sustainability objectives, such as regional job creation, landfill diversion, or promoting circular economy practices.
- **Revenue Streams:** Service-based and infrastructure-driven, e.g., land leasing, utility usage fees, facility management, energy services.
- **Example:** Dual governance models where one entity manages industrial park infrastructure while another coordinates innovation and symbiosis facilitation.





Developing a Circular Hub Business Model

Types of Circular Hub Business Models

2. Managerial Hubs:

- **Focus:** Facilitation, matchmaking, feasibility studies, ecosystem coordination, and innovation support. Typically, do not own infrastructure.
- **Value Proposition:** Network-based, accelerating collaboration and redesigning value chains.
- **Orientation:** Accommodative: Supporting companies to implement symbiosis. Or Proactive: Driving systemic industrial transformation, influencing policies, and promoting climate-neutral business logics.
- **Revenue Streams:** Membership fees, public grants (EU, national, regional), service fees for consultancy, feasibility studies, educational programs, and data analytics services.
- **Examples:** Often relying on memberships and funding to support network expansion, knowledge sharing, and innovation initiatives.



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Developing a Circular Hub Business Model

Types of Circular Hub Business Models

3. Hybrid Hubs:

- **Focus:** Combine operational and managerial functions, integrating infrastructure provision with facilitation and service delivery.
- **Value Proposition:** Mixed, offering both physical resources and knowledge-based services to members.
- **Orientation:** Defensive, accommodative, or proactive depending on mission.
- **Revenue Streams:** Diversified; infrastructure fees (land, utilities, facilities) plus service-based revenues (advisory, data analysis, training).
- **Examples:** Often involving public-private-research collaborations, targeting sector modernization or industrial decarbonization, and progressively reducing reliance on public funding.



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Developing a Circular Hub Business Model

Strategic Considerations for Governance and Business Models

A sustainable I-US hub requires **alignment between governance structure, operational ambition, and financial strategy**:

Public funding should **de-risk early feasibility and innovation phases** while demonstrating economic viability.

Over time, hubs should **transition toward mixed revenue models**, combining service fees, infrastructure income, and project-based funding.

Financial sustainability must be considered from inception, integrating governance, risk management, and operational planning to increase credibility with stakeholders and investors.

By combining effective governance with robust business models, circular hubs can facilitate I-US at scale, enabling long-term economic, environmental, and social value creation.



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SYMSITES Training Materials on
Industrial-Urban Symbiosis

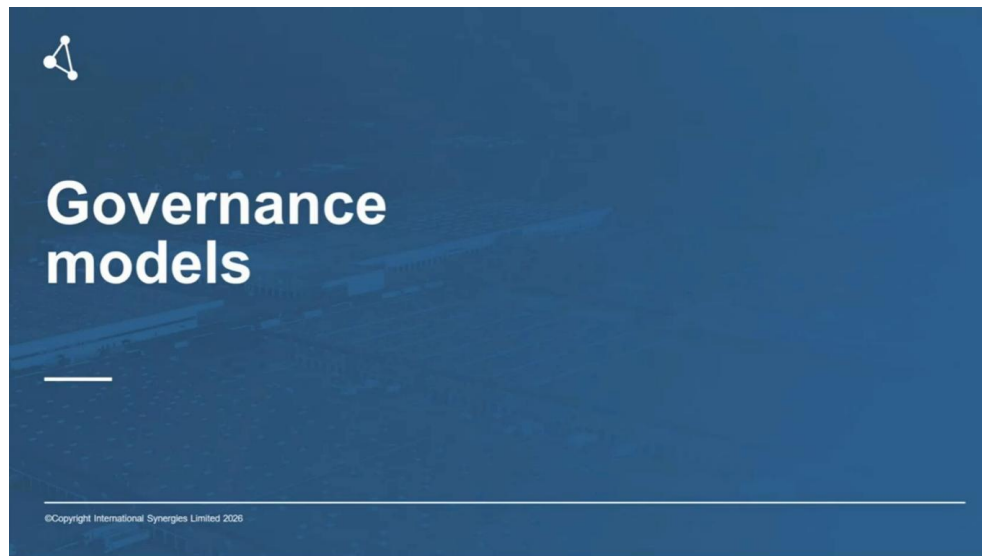
← [Module 4: Regulatory Challenges and Economic Considerations in I-US](#)

H4C Training – I-US Governance Models

Click on the image to watch the video from the H4C Training on I-US Introduction and Governance Models

Presented by:

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CONSORTIUM MAP

