

INDUSTRIAL SYMBIOSIS GUIDE FOR CONCEPTUALISING BUSINESS RELATIONS

EPOS insights are publications summarising the most relevant outcomes of the EU funded EPOS project. The overall aim of the EPOS project is to enable cross-sectorial industrial symbiosis and provide a wide range of technological and organisational options for making business and operations more efficient, more cost-effective, more competitive & more sustainable across process sectors.

INTRODUCTION ---

To promote industrial symbiosis (IS) implementation in process industries, the EPOS project delivers supporting tools and methodologies dedicated to practitioners. This insight introduces the developed methodology which identifies synergy opportunities that can lead to the creation of preliminary business cases. These final outcomes provide decision-makers with the necessary information to quickly decide whether to put effort into the implementation of an IS project.

BACKGROUND ---

This methodology has been iteratively developed by the EPOS project thanks to synergy analyses in the five demonstration clusters. It builds on the experiences of universities, SMEs and industries. It is designed to be generic, so that it is widely applicable in various contexts. Most importantly, it is to be realistically used by stakeholders by trying to limit efforts in terms of time spent and data required. Its final goal is not to make a detailed assessment of the synergy but to make a preliminary opportunity analysis and trigger the interest of the stakeholder decision-makers, who could then decide to further detail the project analysis. This guide has the role of IS accelerator, enabling a quick identification of relevant opportunities and analysis.

IS GUIDE ---

The methodology is translated into a 6-step guide for industries and IS facilitators (cluster managers, consulting companies, local public bodies, associations, academics, etc.). The process follows a chronological order, as each step's outcomes are used as inputs for one or several other steps. External sources of information are required to initiate step 1 and complete steps 3, 4 and 5 (mainly technical and contextual information, and exchanges with stakeholders). The outcome of the whole process is a synergy-specific business case dedicated to each involved stakeholder in the synergy creation.

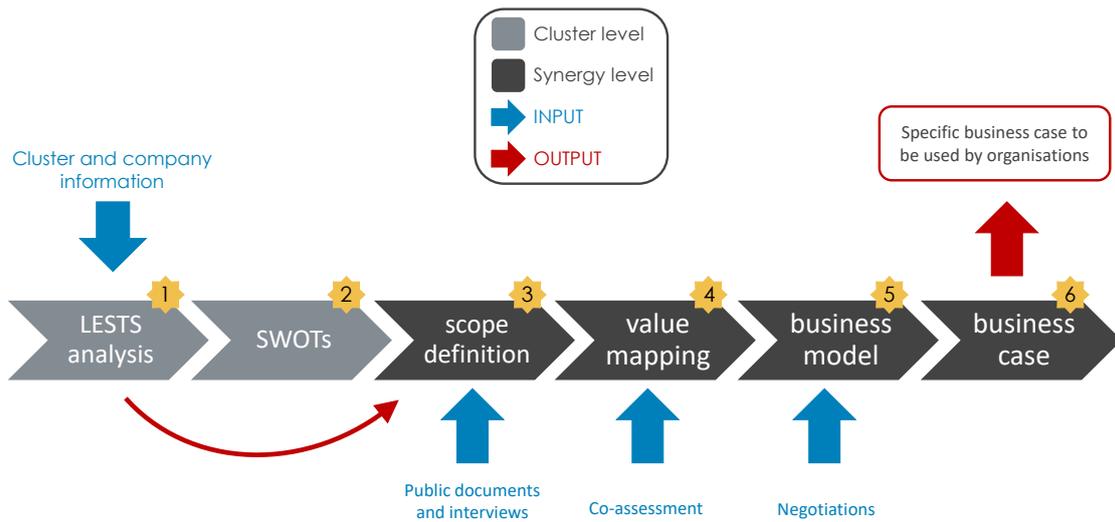


Figure 1: Synergy analysis block

This process is divided into two main blocks represented in light and dark blue (Figure 1). The first block contains two steps and is led at the cluster level. It is used as a methodology to identify and prioritise synergy opportunities in a specific area. The outcomes of step 2 can lead to an extended list of synergies which are then individually analysed in detail in the second block. This second block (steps 3 – 6) gathers the central elements to conceptualise business relations and could be plugged into any other synergy identification means, such as the EPOS toolbox. The main advantage of using the LESTS and SWOT steps (explained below) is that they do not require any software tools and can be easily led by any actor.

Step 1. LESTS analysis

Methodology: (1) Analyse publicly available information about the cluster according to Legal, Economic, Spatial, Technical, and Social aspects (Figure 2); (2) send an extensive LESTS questionnaire to key actors; (3) make a complementary literature review to identify synergy opportunities.

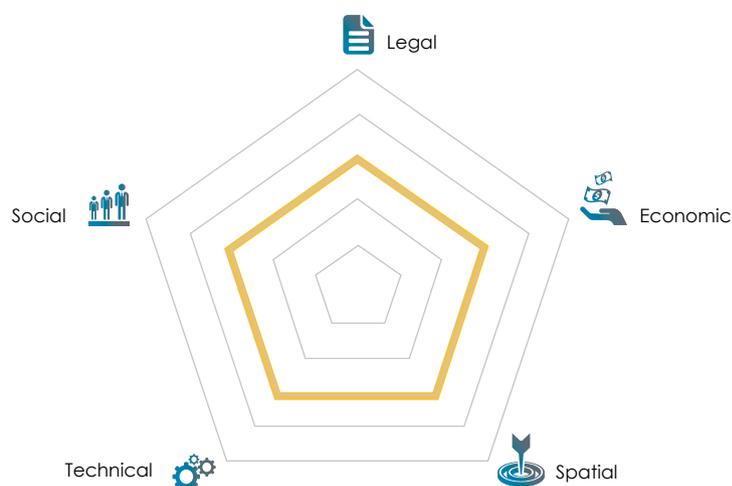


Figure 2: LESTS pentagon

Expected outputs: A list of prioritised synergy opportunities in a local industry or district cluster; a qualitative assessment of the context predisposition to develop IS and the type of relationships among cluster stakeholders.

Required inputs: Broad information about the cluster and its actors (bibliography, extended survey, etc.).

Recommended step leader: A local IS facilitator knowing the context of the situation.

Step 2. SWOT analysis

Methodology: Make a SWOT analysis (Figure 3) at the cluster level and resource level for each individual synergy.

Expected outputs: A rough characterisation of synergies with the main attention points; first go/no go for synergy implementation; definition of IS cluster strategy.

Required inputs: General information and contextual information for the synergy opportunity.

Recommended step leader: Any industry or organisation directly involved in a foreseen synergy or a regional IS facilitator.



Figure 3: SWOT analysis

Step 3. Scope definition and ecosystem creation

Methodology: (1) Focusing on a single synergy, identify the stakeholders' ecosystem of central, peripheral and external actors (Figure 4); (2) define the synergy analysis scope in an iterative way (specific literature review and interviews with relevant actors).

Expected outputs: A list of stakeholders involved, implied and impacted by the synergy; formalisation of the business as usual and synergy scenarios to assess.

Required inputs: One specific synergy idea and the technical, economic, regulatory and contextual information (bibliography, surveys, etc.).

Recommended step leader: An IS facilitator with neutral status to engage several actors and collect data from them.

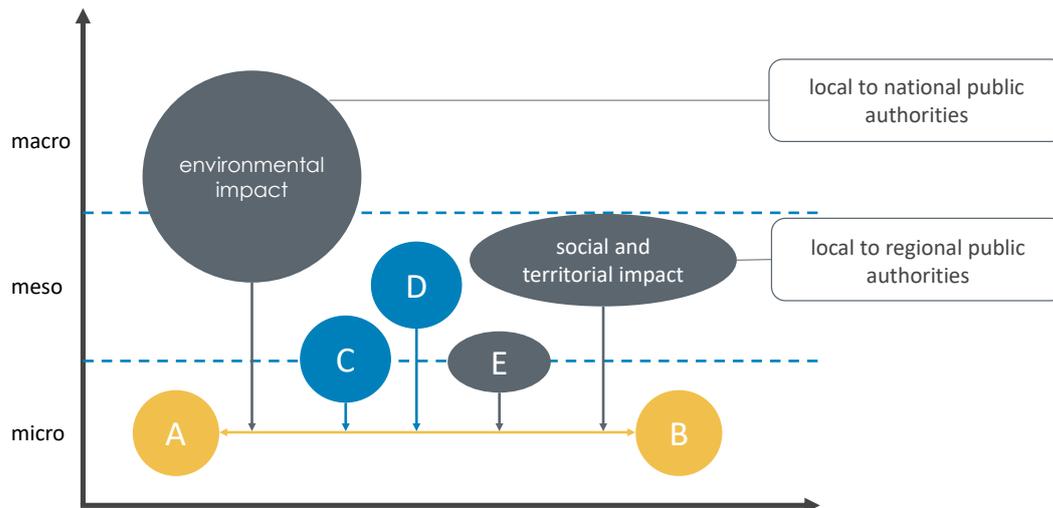


Figure 4: Synergy ecosystem

Step 4. Synergy value mapping

Methodology: The assessment of (1) economic (new revenues, costs avoided, costs created, foregone incomes, etc.); (2) environmental (Life Cycle Thinking (LCT)); (3) social (network development); and (4) territorial (attractiveness, development, autonomy) values for all stakeholders for the synergy scenarios (Figure 5).

Expected outputs: A list of quantified (and/or qualified) values created and/or destroyed by the potential synergy, both globally and for each stakeholder.

Required inputs: Resource and processes quantitative and qualitative data; LCI software; collective discussions.

Recommended step leader: An IS facilitator with neutral status to manage data and lead assessments and consultations.

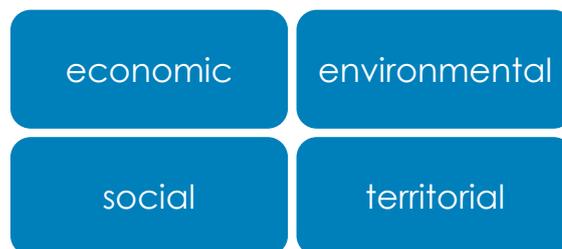


Figure 5: Synergy value map

Step 5. Business model conceptualisation

Methodology: Fill in the IS sustainable business model canvas with analysis outcomes: value propositions, cost structure, revenue streams, financial and non-financial mechanisms to internalise environmental, social and territorial externalities, stakeholders' ecosystem, key resources and activities, partners relationships (Figure 6).

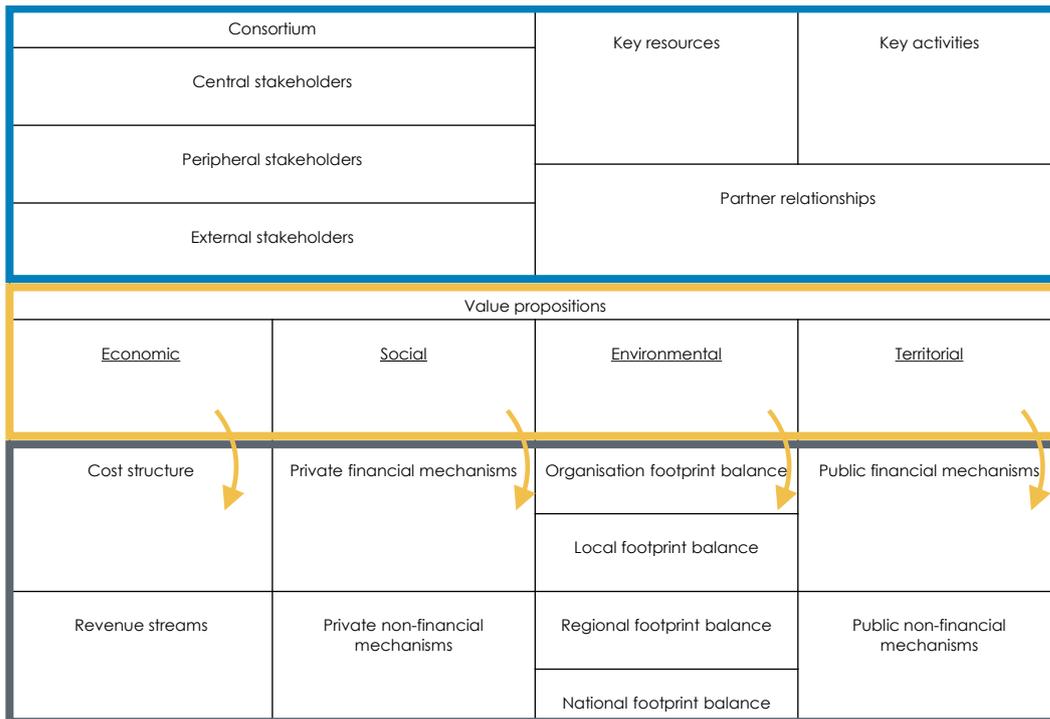


Figure 6: Business model canvas

Expected outputs: A thorough understanding of the synergy (engaged resources and activities, relation and contractual clauses, etc.), monetary and non-monetary value transfer and capture mechanisms.

Required inputs: A list of values created or destroyed by the potential synergy; knowledge of public and private financial and non-financial mechanisms.

Recommended step leader: An IS facilitator with legal, financing and mediation expertise.

Step 6. Preliminary business cases

Methodology: Creation of brief documents summarising all required information for each organisation to decide whether the synergy creation process should go to implementation. It integrates both risks and contractual elements.

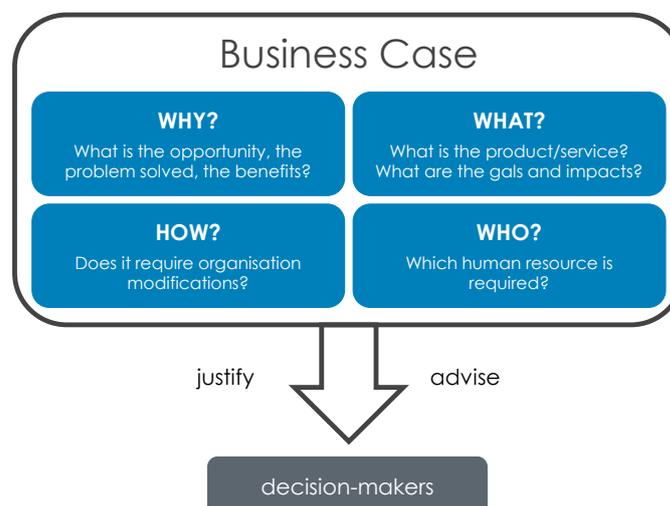


Figure 7: Business case documentation

Expected outputs: A concise document dedicated to each actor summarising the synergy interests, impacts and risks.

Required inputs: A detailed understanding of the synergy.

Recommended step leader: An IS facilitator; any industry wanting to foster interest of a potential partner.

RESULTS

The experiences from the EPOS project indicate that the methodology can provide researchers and companies with a useful reference for IS implementation. Helping not only with the investigation of different IS possibilities and scenarios, but also with the identification of the main barriers and challenges to be overcome. Fifteen to twenty synergies have been studied following the analysis framework, leading to generic conclusions of needs, motivations and barriers per synergy typology; resulting in generic IS cases. Some cases have triggered concrete talks between industrial partners that could lead to real synergy implementation.



COLOPHON

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