



**“MARITIME CLUSTERS
SUPPORTING RESEARCH &
INNOVATION TO ENHANCE
BLUE ECONOMY
ENTREPRENEURSHIP”**

D.2.1.3.A.

**“Contribution to the
Definition of qualitative and
quantitative indicators of the
triple helix matrix”**

Partnership:



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Technical Support:

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Introduction

Scope of the deliverable

The deliverable D.2.1.3.A. “Definition of qualitative and quantitative indicators of the triple helix matrix” represents the backbone research methodology of CoRINThos project, aiming at elaborating the Blue Economy maps of the phase 2.2.1, based on defined qualitative and quantitative indicators. The objective of the matrix is to present the current situation of the identified existing or potential Mediterranean maritime clusters, taking into account specific characteristics.

The main goal of the matrix is to map potentialities and gaps that need to be tackled in order to create successful maritime clusters focused on R&D activities. Following this mapping activity, the partnership will define sound proposals at transnational level that will ensure their related sustainability as well as their further development during the hypothesis of Blue Economy scenario.

The Triple Helix Approach

A conceptual framework for the changing position of universities, business and government, within the systems of innovation, is the model of the “triple helix” which highlights the growing interaction between institutional bodies as innovation systems (Etzkowitz, 2002). In addition to the links between institutional organizations, each organization must be involved in the roles of the other. Consequently, universities adopt business roles as marketing and spin-offs, and companies adopt a research dimension.

In the triple helix model the three actors (educational institutions, businesses, state) interact, going from bilateral relations Business / State, University / State, University / Business to trilateral relations, especially at regional level. These trilateral relations aim at promoting economic growth based on knowledge.

Educational institutions and research institutes play a central role in the development and introduction of innovation in production. Specifically, they constitute a business factor through the creation or participation of new companies (start-ups) in incubators. The State often undertakes to finance new businesses and innovative investment projects, which, in many cases, are accompanied by a high risk (venture capital).

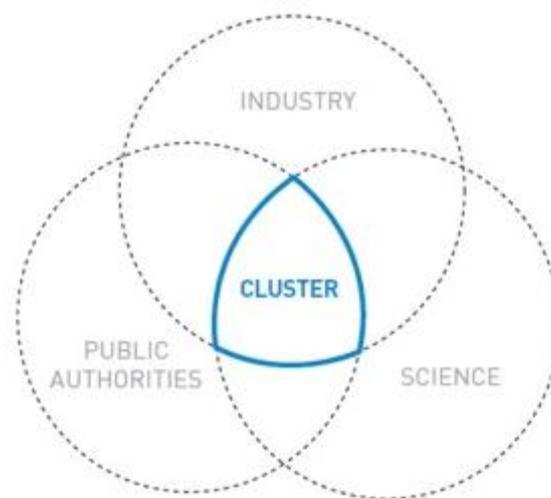


Figure 1: The Triple Helix Approach

In the triple helix model, the spheres overlap, suggesting close cooperation and interaction between the three organizations. These three overlapping spheres at points of intersection can be interpreted as a triptych knowledge-consensus-innovation.

To sum up, the Triple Helix concept combines the following elements:

- The University has a more evident and active role in innovation, equally as business and government in a knowledge-based society.
- There is the tendency to adopt a more collaborative approach among the three factors, in which innovation strategy constitutes a result of interaction rather than a State's requirement.

- Each institutional sphere fulfills not only its traditional role but also takes the role of the other factor. It should be pointed out that institutions, which take other roles constitute important sources of innovation.

Triple Helix Model	
Institution	Source of:
Business	Production
State	Contractual relations that guarantee stable interactions and exchange
University	New knowledge and technology

The Triple Helix approach emerged in mid 1990s, a time when Universities and industry were exported by policy makers to work together more closely for the benefit of society resulting from the commercialization of new knowledge. This approach constituted a confluence between Henry Etzkowitz’ interest in the cooperation of Universities and the Market and Loet Leydesdorff’s interest in an evolutionary model in which there is an overlay of communications between different and independent spheres of activities.

The first published paper on this issue was “The Triple Helix - University – Industry – Government Relations: A Laboratory for Knowledge- Based Economic Development”, written by Etzkowitz and Leydesdorff.

Important Statements on Triple-Helix State of the Art:

- *University shifts from the position subordinated to industry and government to equally important position or even leading position in economic development (Etzkowitz, Webster, Gebhardt, & Terra, 2000)*

- *The three sectors should cooperate mutually and each sector should play some additional roles that the other two sectors originally play (Leydesdorff, 2001)*
- *Hybrid organizations are generated with the interaction between university, industry, and government in the innovation sphere, which take additional responsibilities or functions U-I-G can't complete (Etzkowitz, 2008)*

Methodology

Based on the strategy of CoRINThos project and on the outcomes of previous implementation phases, the main goal of the Triple Helix Matrix is to depict the current status situation when it comes to existing and potential maritime clusters that will result in concrete recommendations for future governance, policy and investment decisions at regional/national level with a transnational MED perspective.

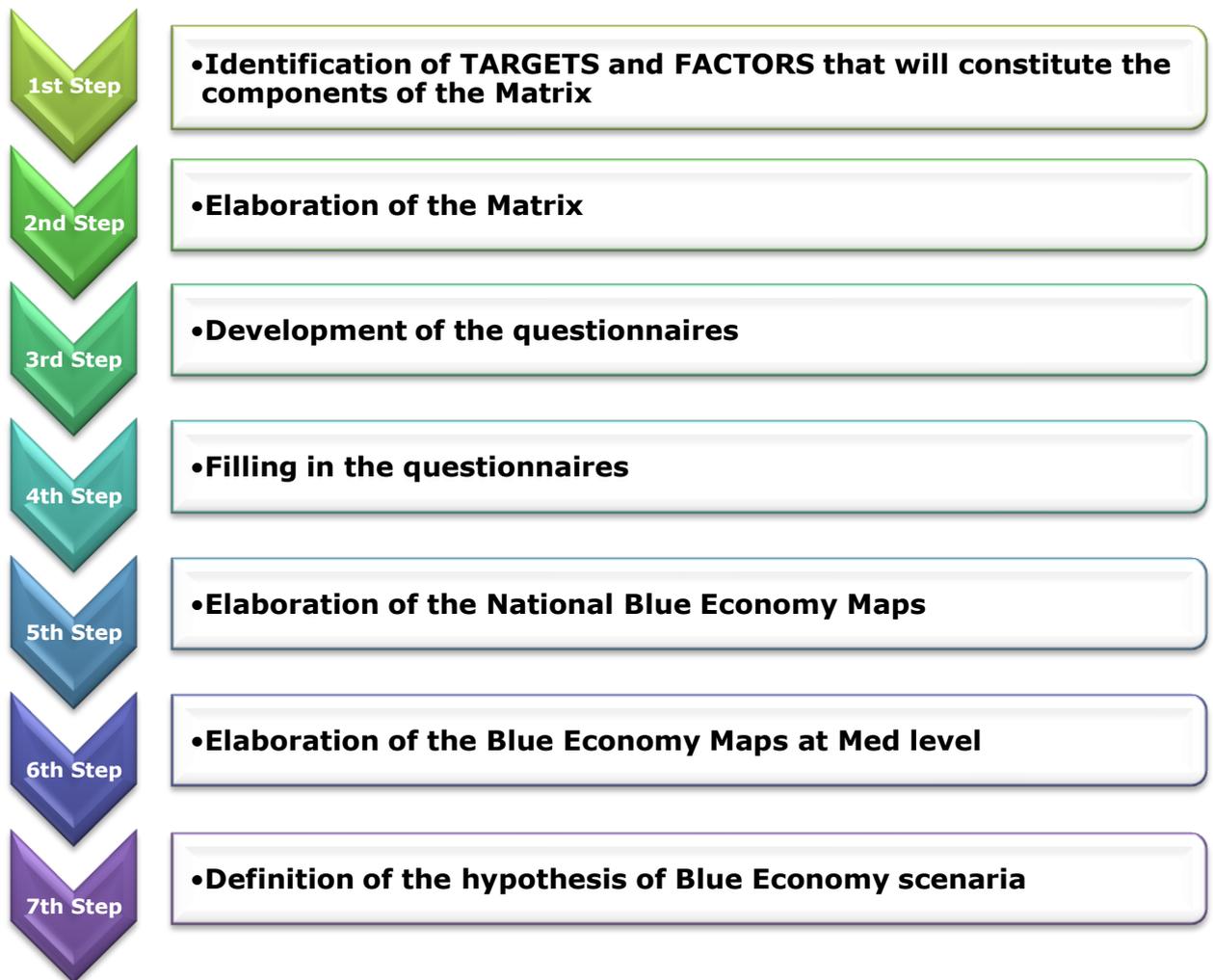
This scope will be achieved through a structured methodology that integrates quantitative and qualitative elements in specific TARGETS and FACTORS that will formulate vertically and horizontally the triple helix matrix.

More specifically, major objectives of the matrix are to:

- Depict and define the current state of the existing and potential maritime clusters identified during the mapping process in a more clear and comparable way.
- Identify the existing gaps that inhibit the further development of the clusters, as well as the remarkable characteristics and practices that could serve as examples to be followed by other countries.
- Present specific initiatives that will be proposed by representatives of the Public Sector, the Academia/ Universities and Business sector based on the different combination of Targets and Factors.

Taking into consideration the project’s objectives, the definition of successful clusters as well as the main relevant EU policy papers and strategies on Clusters, the partnership will define and develop a methodology that respects all the above and integrates quantitative and qualitative elements of TARGETS and FACTORS towards the sustainability and further development of maritime clusters.

The following diagram represents the methodological steps that are proposed in order to reach the final objective that is the elaboration of the Blue Economy Maps and the Definition of the hypothesis of Blue Economy scenaria.



The first step of the methodology is to define the main **TARGETS** and **FACTORS**, as they are presented below, addressing the objective of the Matrix and the project. The second step is to elaborate a MATRIX combining the main targets and factors through specific questions and criteria. The next step is the identification of specific questions that will offer the necessary input in order to fill in the cells of the Matrix for each identified cluster/ maritime sector, resulting in the implementation of the Regional/ National Blue Economy maps and their integrated results at MED level.

Subsequently, the outputs provide concrete proposals for future governance, policy recommendations and investment decisions at regional/national/ interregional level.

- Targets and Factors

Aiming at identifying the axes of the Matrix, it is necessary to define:

the **Targets**, in other words **the objectives that the Clusters should achieve through its operation** and

the **Factors**, in other words, **the means that will contribute to the implementation of the above mentioned objectives.**

The **Targets** will constitute the **horizontal axis** of the Matrix and the **Factors** the **vertical**.

The identified initiatives comprise a combination of **five main "Targets"** and **five main "Factors"**. The list of the proposed Targets and Factors are presented in the following tables.

The use of the of the matrix has been proposed in order to design a format that would facilitate the combination of the targets and the factors as well as the comparison among the different maps that will result from the use of the matrix and the reply to the respective questions.

The five **Targets** are:

1. R&D and Innovation

Research & Development and innovation activities play a crucial role in the successful operation of clusters and in their economic growth. These activities contribute directly to the level of prosperity and the main aim of policy in the field of research and technological development is to establish the European Union as a leading knowledge-based economy.

2. Sustainability / Environmental Protection

One of the clusters' targets should be to ensure a sustainable and energy efficient operation with less pollution and negative environmental effects. This target may be certified by specific standards.

3. Competitiveness / Comparative Advantage

The members that constitute a cluster aim at enhancing their competitiveness in the regional, national or international market, by participating in the partnership. It is also rather important to have a comparative advantage which could be the synthesis of the cluster, the reliability, its standards, skills etc.

4. Globalization

There is a direct link between globalization and increased SMEs performance. Global activities reinforce growth, enhance competitiveness and support the long term sustainability of companies. Yet European SMEs still depend largely on their domestic markets despite the opportunities brought by the enlarged single market and by globalization at large.

5. Development

Maritime clusters play a crucial role in enhancing the development and growth of the respective markets and the involved maritime sectors. It should be pointed out that the organizations that cooperate in the framework of a cluster, recognize the added value that his partnership can offer to their performance.

The five **Factors** are:

1. Legislative Framework

National regulations, EU regulations, Policies, Initiatives, planning and policymaking frameworks, regulations and principles steering the development of clusters in the desirable directions, management and organizational approaches

2. Structure

Basic characteristics of a cluster in terms of participating enterprises and organizations, partnerships among public and private sector, types of partners, geographical coverage, governance etc.

3. Knowledge Management

It refers to a multi-disciplined approach to achieving organizational objectives by making the best use of knowledge Training incentives organized by each participating member either independently or due to the collaboration in the framework of the cluster, educational level of the cluster’s HR with special focus on researchers.

4. Financing Channels / Access to finance

Financial incentives, Funding opportunities or Investments in specific sectors of the cluster that boost the growth of the cluster and its competitiveness.

5. Networking

Collaboration with organizations not belonging to the cluster, links with other national or international clusters in the same or different sectors that contribute in the extroversion of the cluster.

Triple Helix Matrix

- Structure of the Matrix

The MATRIX is composed of 25 boxes – sets of combinations among **TARGETS** and **FACTORS**. By this way each one of the box-set combines one Target with one Factor. The objective is to combine each Factor with each Target through the reply to specific questions. The questions will be answered for each maritime sector that is covered by each mapped existing or potential maritime sector.

Aiming at incorporating the **Triple Helix approach** in this Matrix, after **answering the questions for the mapped clusters**, each partner will be in charge of organizing **interviews** (the number will be confirmed in accordance with the consortium) with representatives of the **public sector**, the **Universities** and **Business sector** that will propose specific **initiatives from their point of view** combining each Target with each Factor. The result will be **a list of recommendations** according to **Triple Helix Approach** that will correspond to each Maritime Sector.

For example:

A partner has mapped a cluster operating in **shipping sector**.

Step 1: The partner will try to answer all the questions, giving concrete responses that show what the cluster does to combine each Factor with each Target. In this process, he may need the support of a cluster's representative. The answers that will not be answered will constitute the gaps in its operation.

Step 2: The partner will arrange meetings (number to be confirmed) with representative(s) of each part of the Triple Helix model → State, University, Business, who are related to the specific Maritime Sector, in order to give their opinion and propose initiatives that could combine the Factors with the Targets. It is noted that in the Matrix **"S"** stands for State, **"U"** for University, **"B"** for Business.

According to the previous analysis, the Matrix is proposed to have the following structure:

		COUNTRY / MARITIME SECTOR					
		TARGETS					
		<i>T1- R&D and Innovation</i>	<i>T2- Sustainability/ Environmental Protection</i>	<i>T3- Competitiveness / Comparative Advantage</i>	<i>T4- Globalization</i>	<i>T5- Development</i>	
FACTORS	F1- Legislative Framework	1st Step					
		2nd Step	S:	S:	S:	S:	S:
			U:	U:	U:	U:	U:
	B:		B:	B:	B:	B:	
	F2- Structure	1st Step					
		2nd Step	S:	S:	S:	S:	S:
			U:	U:	U:	U:	U:
	B:		B:	B:	B:	B:	
	F3- Knowledge Management	1st Step					
2nd Step		S:	S:	S:	S:	S:	
		U:	U:	U:	U:	U:	
	B:	B:	B:	B:	B:		

F4- Financing Channels / Access to finance	1 st Step					
	2 nd Step	S:	S:	S:	S:	S:
		U:	U:	U:	U:	U:
B:		B:	B:	B:	B:	
F5- Networking	1 st Step					
	2 nd Step	S:	S:	S:	S:	S:
		U:	U:	U:	U:	U:
B:		B:	B:	B:	B:	

Table 1: Triple Helix Matrix structure

- Use of the Matrix as a tool

The concept of the MATRIX focuses on the fact that R&D and Innovation, Sustainability/ Environmental Protection, Competitiveness / Comparative Advantage, Globalization and Development (Targets) are related to Legislative Framework, Structure, Knowledge Management, Financing Channels / Access to finance, Networking (Factors).

The concept of the MATRIX will be used as a guideline for the elaboration of the questionnaire that will be sent to partners. The questions will have as objective to define the role of each Factor in the achievement of each Target, based on the characteristics, operation and performance of each identified cluster. As a result, each partner will elaborate the respective number of Blue economy maps, according to the number of existing or potential clusters of their country. Partners' responses coupled with the MATRIX will result in the formulation of the Blue Economy Maps.

An example of a specific question follows. Combining the **Target "R&D and Innovation"** and the **Factor "Financing Channels / Access to finance"** each partner is requested to define "specific financial initiative(s) that encourage the development of R&D and Innovation Activities within the operation of each national maritime cluster, or investments that have already been implemented. Respective questions will be developed for all the possible combinations of Targets and Factors.

Through the elaboration of Blue Economy maps, the partnership will have a tool that will allow the comparative analysis of the maritime clusters and they will be able to prepare the respective Maps at MED level per maritime sector.

- Questionnaire

In order to capture the current status of the existing and potential maritime clusters, identify the gaps and depict the best practices, a questionnaire was designed.

The questionnaire is based on the MATRIX concept and includes a set of qualitative and quantitative questions/criteria combining the defined Targets (R&D and Innovation, Sustainability/ Environmental Protection, Competitiveness/ Comparative Advantage, Globalization and Development) and the Factors (Legislative Framework, Structure, Knowledge Management, Financing Channels / Access to finance, Networking).

The specific questions will be used as guide questions-criteria aiming at helping the partners on data collection as well as provide answers and propose specific initiatives/actions for the Maritime clusters.

The concept of the MATRIX focuses on the fact that Legislative Framework, Structure, Knowledge Management, Financing Channels / Access to finance, Networking could contribute to support R&D and Innovation, Sustainability/ Environmental Protection, Competitiveness/ Comparative Advantage, Globalization and Development within the operation of the clusters.

It is proposed that the questionnaire will be filled in separately for each cluster per maritime sector. Each partner will be responsible to fill in the questionnaire (either on their own or through the cooperation with the respective stakeholders/ representatives of the mapped maritime clusters) and the respective matrix for each cluster of his country and more specifically, for each maritime sector that is covered by the operation of each cluster.

More specifically, the proposed questionnaire that is presented below, collects data divided into 5 main categories of 5 subcategories each (combination of Factors and Targets):

Target 1- R&D and Innovation

a. (T1) R&D and Innovation –

(F1) Legislative Framework:

Do the legislative framework/ regulatory bodies/policy makers/ contribute to the adoption and enhancement of R&D and Innovation activities within the operation of the cluster?

b. (T1) R&D and Innovation –

(F2) Structure:

Does the cluster's structure support the integration of R&D and Innovation activities within its operation? Does it have members that are for example Institutes or does it have R&D department?

c. (T1) R&D and Innovation –

(F3) Knowledge Management:

Do the cluster's members organize training sessions / seminars on R&D and Innovation? Does the educational level of the staff permit the implementation of R&D activities?

d. (T1) R&D and Innovation –

(F4) Financing Channels / Access to finance:

Has the cluster access to financing channels in order to support R&D and Innovation activities? Have its members invested in R&D?

e. (T1) R&D and Innovation –

(F5) Networking:

Do the cluster's members have liaisons with other clusters/ organizations that could support them in the adoption of R&D and Innovation activities?

Target 2 - Sustainability / Environmental Protection

a. (T2) Sustainability / Environmental Protection –

(F1) Legislative Framework:

Do the legislative framework/ regulatory bodies/policy makers/ contribute to the application of initiatives that protect the environment through the operation of the cluster?

b. (T2) Sustainability / Environmental Protection –

(F2) Structure:

Does the cluster's structure support the integration of initiatives for the protection of the environment? Does it have members with a department specialized in the environmental protection?

c. (T2) Sustainability / Environmental Protection –

(F3) Knowledge Management:

Do the cluster's members organize training sessions / seminars on Sustainability and Environmental Protection?

d. (T2) Sustainability / Environmental Protection –

(F4) Financing Channels / Access to finance:

Has the cluster access to financing channels in order to invest in equipment for the protection of the environment? Have its members invested in equipment for the protection of the environment?

e. (T2) Sustainability / Environmental Protection –

(F5) Networking:

Do the cluster's members have liaisons with other clusters/ organizations that could support them in the adoption of practices or applications that protect the environment?

Target 3 - Competitiveness / Comparative Advantage

a. (T3) Competitiveness/ Comparative Advantage–

(F1) Legislative Framework:

Do the legislative framework/ regulatory bodies/policy makers/ internal regulations contribute to the enhancement of competitiveness for the cluster?

b. (T3) Competitiveness/ Comparative Advantage–

(F2) Structure:

Does the cluster's structure support the creation of a comparative advantage in comparison to other clusters or partnerships? Does its structure boost its competitiveness?

c. (T3) Competitiveness/ Comparative Advantage–

(F3) Knowledge Management:

Do the cluster's members organize training sessions / seminars on competitiveness/ entrepreneurship? Does the educational level of the staff constitute a comparative advantage of the cluster?

d. (T3) Competitiveness/ Comparative Advantage–

(F4) Financing Channels / Access to finance:

Has the cluster access to financing channels in order to support its competitiveness in the respective market?

e. (T3) Competitiveness/ Comparative Advantage–

(F5) Networking:

Do the cluster's members have liaisons with other clusters/ organizations that could play a crucial role in their competitiveness/ comparative advantage?

Target 4 – Globalization

a. (T4) Globalization –

(F1) Legislative Framework:

Do the legislative framework/ regulatory bodies/policy makers/ internal regulations contribute to the globalization of the cluster’s activities?

b. (T4) Globalization –

(F2) Structure:

Does the cluster’s structure support its globalization? Does it have the bases to promote its operation in other regions/ countries?

c. (T4) Globalization –

(F3) Knowledge Management:

Do the cluster’s members organize training sessions / seminars on globalization? Does the educational level of the staff permit the globalization of its activities?

d. (T4) Globalization –

(F4) Financing Channels / Access to finance:

Has the cluster access to financing channels in order to support its globalization? Have its members invested in relative sectors?

e. (T4) Globalization –

(F5) Networking:

Do the cluster’s members have liaisons with other clusters/ organizations that could support their efforts for globalization and the cooperation with other partnerships/ clusters?

Target 5 – Development

a. (T5) Development–

(F1) Legislative Framework:

Do the legislative framework/ regulatory bodies/policy makers/internal regulations contribute to the development of the cluster?

b. (T5) Development –

(F2) Structure:

Does the cluster’s structure support the development of the cluster/ the promotion of several imperatives of Blue Growth?

c. (T5) Development –

(F3) Knowledge Management:

Do the cluster’s members organize training sessions / seminars aiming at enhancing its development?

d. (T5) Development –

(F4) Financing Channels / Access to finance:

Has the cluster access to financing channels in order to enhance its development and further growth?

e. (T5) Development –

(F5) Networking:

Do the cluster’s members have liaisons with other clusters/ organizations/ partnerships that could support them in boosting their development and the promotion of Blue Growth imperatives/ their involvement in several maritime sectors?

According to the double use of the Matrix, we will have the following results:

1. All partners will try to answer the questions for each sector that their National Maritime clusters cover. The questions that cannot be answered by taking into consideration the operation of each identified cluster will result in empty cells and will imply that there are the specific gaps. On the other hand, when all Blue Economy Maps will be filled in, the partnership will have the opportunity to check how the other clusters combine the Factors and the Targets in the cases that their Maps had empty cells.

The partners will answer the questions of each combination, or they can propose other questions that combine in the best way one factor with one target based on each case. The Data that will be filled in the matrix will have the structure of bullet points in order to facilitate the presentation and the comparison among the different Blue Economy maps.

2. Below each answer, the partner will fill in the initiatives that each representative of Triple Helix model has proposed during the interview (in bullet points), which will also serve as recommendations for the operation of a successful maritime cluster. In this way the partnership will have the opportunity to gather input based on Triple Helix approach.

		GREECE/ SHIPPING SECTOR					
		TARGETS					
		<i>T1- R&D and Innovation</i>	<i>T2- Sustainability/ Environmental Protection</i>	<i>T3- Competitiveness / Comparative Advantage</i>	<i>T4- Globalization</i>	<i>T5- Development</i>	
FACTORS	F1- Legislative Framework	1st Step	Answer - -	Answer - -	Answer - -	Answer - -	No Answer GAP
		2nd Step	S: Initiative ...	S: ...	S: ...	S: ...	S: ...
			U: Initiative ...	U: ...	U: ...	U: ...	U: ...
	B: Initiative ...		B: ...	B: ...	B: ...	B: ...	
	F2- Structure	1st Step	No Answer GAP	Answer - -	Answer - -	Answer - -	No Answer GAP
		2nd Step	S: ...	S: ...	S: ...	S: ...	S: ...
			U: ...	U: ...	U: ...	U: ...	U: ...
	B: ...		B: ...	B: ...	B: ...	B: ...	
	F3- Knowledge Management	1st Step	No Answer GAP	Answer - -	Answer - -	Answer - -	Answer - -
		2nd Step	S: ...	S: ...	S: ...	S: ...	S: ...
U: ...			U: ...	U: ...	U: ...	U: ...	
B: ...	B: ...		B: ...	B: ...	B: ...		

F4- Financing Channels / Access to finance	1 st Step	Answer	Answer	Answer	Answer	Answer
		-	-	-	-	-
	2 nd Step	S: ...	S: ...	S: ...	S: ...	S: ...
		U: ...	U: ...	U: ...	U: ...	U: ...
B: ...		B: ...	B: ...	B: ...	B: ...	
F5- Networking	1 st Step	No Answer GAP	Answer	Answer	Answer	No Answer GAP
		-	-	-	-	
	2 nd Step	S: ...	S: ...	S: ...	S: ...	S: ...
		U: ...	U: ...	U: ...	U: ...	U: ...
B: ...		B: ...	B: ...	B: ...	B: ...	

Table 2: Example of a “filled in” Blue Economy Map

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