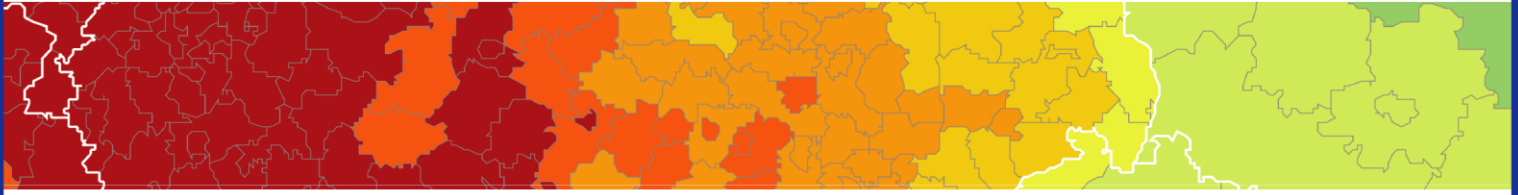


Inspire policy making by territorial evidence



TEVI – Territorial Evidence Support for European Territorial Cooperation Programmes

Targeted Evidence Support

D4 Activity Report

D4 Activity Report

This targeted evidence support activity is conducted within the framework of the ESPON 2020 Cooperation Programme.

The ESPON EGTC is the Single Beneficiary of the ESPON 2020 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway and Switzerland.

This delivery does not necessarily reflect the opinion of the members of the ESPON 2020 Monitoring Committee.

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D4 Activity Report

**TEVI – Territorial Evidence
Support for European
Territorial Cooperation
Programmes**

Version 13/08/2019

Table of contents

List of Maps	II
List of Figures	II
List of Tables	II
1 Introduction.....	1
1.1 Overview of Project Goals.....	1
2 Status of Stakeholder Participatory Process	2
2.1 Description of Process	2
2.2 Outcomes Workshop 1	4
2.3 Outcomes Workshop 2.....	5
2.4 Outcomes Workshop 3.....	6
3 The Territorial Evidence Interface	7
3.1 Background and current status	7
3.2 Description of the functionalities.....	7
3.3 Development steps ahead.....	11
4 Steps ahead	12
4.1 Feedback Collection	12
References	13
Annex: Development of Key Territorial Indicators	14

List of Maps

Map 2.1: Map showing 12 INTERREG programmes divided into 3 workshop groups.	3
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List of Figures

Figure 1.1: Outcomes of the ESPON TEVI project	1
Figure 3.1: Main Screen	8
Figure 3.2: Interface (Selection “Filters”).....	8
Figure 3.3: Interface (Selection “Indicators”).....	10
Figure A.1: The approach to the definition of result indicators.....	14
Figure A.2: The logical model of public intervention and the criteria for the definition of appropriate result indicators	16
Figure A.3: Simulated effect of the MED INTERREG program on transnational activity in innovation.....	25

List of Tables

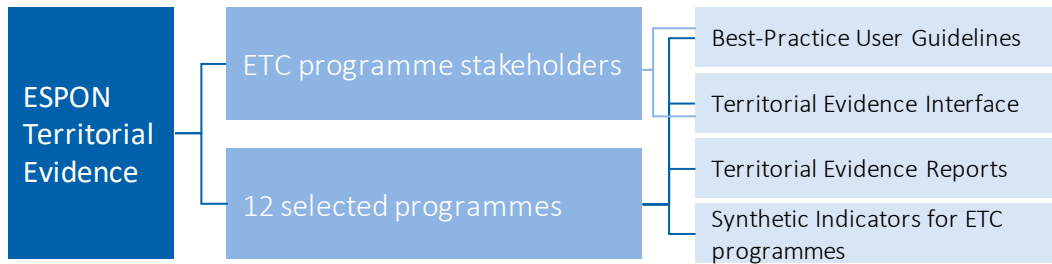
Table 2.1: Allocation of INTERREG programmes to workshop groups	2
Table 2.2: Times and places of the first round of workshops.....	4
Table 2.3: Times and places of the second round of workshops.....	5
Table 2.4: Times and places of the second round of workshops.....	6
Table 4.1: The assessment of proposed result indicators.....	21
Table 4.2: Structure of the data set on the additional result indicators proposed by the TeVi project.....	23
Table A.1: Structure of the data set on Programme objectives and proposed result indicators, in cas.....	19

1 Introduction

1.1 Overview of Project Goals

The TEVI project's aim is to provide territorial evidence for INTERREG programmes. The project works with stakeholders of 12 INTERREG programmes (INTERREG A and INTERREG B) for the purpose of producing outcomes which are mostly transferable to all INTERREG programmes. The outcomes of the project are presented in the figure below.

Figure 1.1: Outcomes of the ESPON TEVI project



Source: Consortium, 2019.

The project develops Best Practice User Guidelines which should serve stakeholders in selecting and working with result indicators. Result indicators are especially challenging for INTERREG programmes and must be appropriately built and applied in order to measure the effects of INTERREG programmes. The second outcome of the project is the Territorial Evidence Interface, an ESPON web-tool which visualizes data and synthetic indicators for INTERREG programmes. The work with the 12 INTERREG programmes also results in 12 Territorial Evidence Reports for each of these programmes. Finally, the TEVI project develops a methodology and a set of synthetic indicators appropriate for measuring the effects of INTERREG programmes as a contribution to providing territorial evidence for such programmes. Although these indicators are developed and applied on twelve participating INTERREG programmes (see table below), the twelve programmes serve as pilots. The methodology of the development of indicators has been built on the assumption of their transferability and applicability to other INTERREG programmes. Custom synthetic indicators can be built in the Territorial Evidence Interface.

The four outcomes of the project are mostly delivered separately in D3. The Best Practice User Guidelines, Territorial Evidence Reports are delivered as separate, stand-alone documents. The Territorial Evidence Interface is a web-tool delivered with a link. Finally, the methodology for developing synthetic indicators is presented in previous deliveries as well as in the annex. In addition, their application in case of the 12 programmes is integrated into the Territorial Evidence Reports.

The implementation of the project has been based on a participatory process involving cooperation with stakeholders.

2 Status of Stakeholder Participatory Process

2.1 Description of Process

The TEVI project bases on a participatory process involving INTERREG stakeholders of the 12 participating INTERREG programmes. A set of workshops has been incorporated into each of the three tasks in order to ensure that stakeholder input will be relevant at each step of the project.

In order to facilitate working with stakeholders, the 12 programmes have been divided into three groups based on geographical location. Given that each of the three groups participated in three workshops which took place parallel to three tasks of the TEVI project, the total number of workshops within the project amounted to nine.

Each group was assigned a group leader, project partner who has most expertise with the programmes in a given group, as well as a supporting partner. Together the group leader and supporting partners ensure the participatory process as well as act as intermediaries between the core team and stakeholders.

The table below presents the groups set up as well as responsible lead partners and supporting partners.

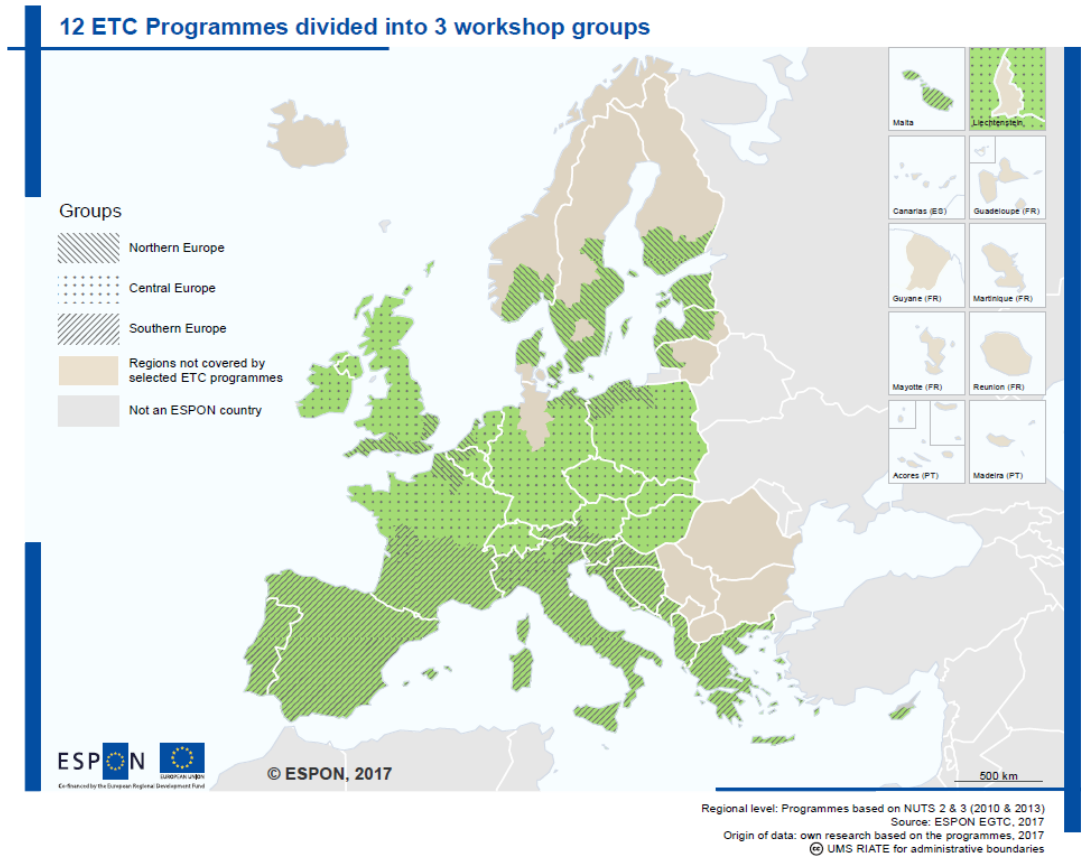
Table 2.1: Allocation of INTERREG programmes to workshop groups

Group 1: Southern Europe	Group 2: Central Europe	Group 3: Northern Europe
Mediterranean (B)	North West Europe (B)	South Baltic (A)
South West Europe (B)	Deutschland-Nederland (A)	Central Baltic (A)
Italy-Croatia (A)	Austria-Czech Republic (A)	Two Seas programme (A)
Italy-Austria (A)	Central Europe (B)	Sweden-Denmark-Norway (A)
Group lead: POLIMI expertise: Mediterranean, Italy-Croatia, Italy-Austria	Group lead: TU DELFT expertise: North West Europe, Deutschland-Nederland	Group lead: Nordregio expertise: Central Baltic, South Baltic, Sweden-Denmark-Norway
Support: ÖIR expertise: South West Europe, Italy-Austria	Support: ÖIR expertise: Central Europe, Austria-Czech	Support: EPRC expertise: Two Seas programme

Source: Consortium, 2017.

The 12 programmes have a geographical scope covering almost the whole EU territory. It was deemed most practical to assign them into groups based on geographical location given that this would facilitate finding locations for three foreseen workshops per group. Geographical proximity is also to some extent responsible for overlapping intervention areas of the programmes. Basing the group division solely on the specific objectives would result in a very unbalanced group selection, given that some specific objectives are more represented than others. The map below shows geographical distribution of groups.

Map 2.1: Map showing 12 INTERREG programmes divided into 3 workshop groups.



Source: own elaboration based on the programme areas, 2018.

The communication between the core group and each group of programme stakeholders was a very organized process. The core team has developed a Communication Plan which encompasses the following:

- Communication methods;
- Communication flows, providing description of the general participatory process;
- Communication sequence in regards to organizing workshops (first notice, deciding workshop date and location, undertaking necessary organizational arrangements, providing workshop documents, conducting workshop and communicating results);
- Communication with Interact;
- Appendices with contacts to programme stakeholders as well as TEVI task leaders.

The document served as guidelines providing information for group lead partner on when to launch communication in regards to each workshop as well as what to communicate. Ultimately, group leads were responsible for deciding on the location and date of workshops in mutual agreement with the participants as well as for organizing workshops. The lead partner has been always at disposal with advice and guidance regarding the process.

The core team encouraged stakeholders of participating programmes to host workshops at their offices in order to ensure their involvement as well as strengthen the exchange. Stakeholders have kindly offered the opportunity to do so. In many cases, it was possible to plan already before the first workshop where the following two events will take place, based

on a survey conducted by the group leader. In effect, with only one exception (third workshop of the Central Europe groupe), all workshops took place at venues of different programmes.

Each workshop culminated in minutes that summarized the process and findings of workshops. They were disseminated to the core team as well as workshop participants. In order to further ensure that the findings of workshops are incorporated into the project, whenever possible, at least one member of core team was present in each workshop.

In general, the participatory process was a very positive experience. There were fruitful and satisfactory exchanges with programme stakeholders and the project team. Stakeholders were generally satisfied with the participatory process.

2.2 Outcomes Workshop 1

Table 2.2: Times and places of the first round of workshops.

	South Europe	Central Europe	North Europe
Time	15 June 2018	13 June 2018	26 June 2018
Place	Bozen/Bolzano	Vienna	Gdansk
Venue	Italy – Austria	Central Europe	South Baltic

Source: Consortium, 2019.

The first round of workshops took place in June 2018. programme group Southern Europe met on 15 June in Bozen/Bolzano in Italy at the venue of Italy – Austria programme, programme group Central Europe met on 13 June in Vienna in Austria at the venue of the Central Europe programme, and programme group North met on 26 June in Gdansk, Poland at the venue of the South Baltic programme. All programmes were able to participate in these workshops, with turnout of representatives between 9 and 12 per session.

The focus of the first round of the workshop was to introduce the participants to the project. In that regard, the preliminary outputs of the project, as well as the underlying methodology, were presented and discussed. The methodology used to assess the result indicators used by the programmes was presented. Further, this allowed the participants to discuss the specificities of capturing the links between interventions and results via indicators. Participants were presented with intervention logics for each of the identified INTERREG objectives in a world café setting. Finally, in a moderated feedback session, participants were able to provide the project team with information on their use of keep.eu as well as on potential uses of the platform.

The workshop round highlighted one major concern in regard to the developed intervention logics: while the intervention logics were generally deemed suitable by the CBC programmes, the larger transnational programmes often found the presented intervention logics not specific enough to their respective needs. On the other hand, the methodology supporting the development of new result indicators was well-received by the participants. However, even here some larger transnational programmes noted some scepticism in regards to the usability

of the result indicators to be developed. There was also an expressed wish to concentrate relatively more on output indicators. The participants also expressed that the use of keep.eu is relatively limited by the programmes themselves, but is generally rather used by potential beneficiaries for “match-making”, as well as finding potential partners.

2.3 Outcomes Workshop 2

Table 2.3: Times and places of the second round of workshops.

	South Europe	Central Europe	North Europe
Time	27 September 2018	1 October 2018	3 October 2018
Place	Santander	Lille	Turku
Venue	South Europe	North West Europe	Central Baltic

Source: Consortium, 2019.

The second round of workshops was held in late September/October 2018 in Santander, Spain (27 September – programme group South Europe) at the venue of South West Europe programme, Lille, France (1 October – programme group Central Europe) at the venue of North West Europe programme, and Turku, Finland (3 October – programme group North Europe) at the venue of Central Baltic programme. Participation was not as high in the second round of workshops due to scheduling difficulties, with fewer programmes than expected participating in workshop group Central Europe. In the two other workshops, turnout was good, with every programme represented.

The workshop was divided into three distinct sections: a presentation and discussion of the methodology used to develop the result indicators, as well as exemplary result indicators, a discussion of the developed indicators in connection with the intervention logics, as well as a presentation of mock-ups of the keep.eu database. The first section of the workshop allowed for a semi-interactive discussion of the underlying methodology, as well as example indicators. A purpose of this discussion was to illustrate the importance of designing methodologically sound indicators when attempting to measure results of a policy intervention. In a wold café setting, the augmented intervention logics discussed in the first round were discussed in connection to the proposed result indicators. Among collecting stakeholder feedback in terms of usability of the indicators, this session also served to connect the developed result indicators with the revised intervention logics. Mock-ups of the proposed keep.eu interface tools were discussed with the participants regarding usability and additional developments they may require.

As in the first round of workshops, a certain level of scepticism regarding the degree of usability of some of the indicators to the larger transnational programmes persisted. It was mentioned that a high degree of complexity in indicators can carry risks, in terms of understanding the methodology. However, the methodology behind the development processes of the indicators was deemed appropriate by the participants. The interactive discussions centred on the outcomes of the assessment of the indicators also provided

learning-effects in regards to the designing of indicators which were reported across the three sessions. Some additional revisions were needed to tie the revised intervention logics together with the new indicators to the specificities of the programmes. A stated wish by some programmes was to be more actively involved in the project.

2.4 Outcomes Workshop 3

Table 2.4: Times and places of the second round of workshops.

	South Europe	Central Europe	North Europe
Time	20 March 2019	19 March 2019	19 March 2019
Place	Marseille	Delft	Malmö
Venue	Mediterranean	TU Delft (project partner)	Sweden – Denmark – Norway

Source: Consortium, 2019.

The third round of workshops took place in March 2019. The programme group South Europe met in Marseille on 20 March at the offices of the Mediterranean programme; the programme group Central Europe met in Delft on 19 March at the offices of project partner TU Delft and the programme group North Europe met the same day in Malmö at the offices of the Sweden – Denmark – Norway programme. The participation in all three workshops ranged from 10 to 3 participating stakeholders.

The workshops consisted of three elements: presentation of synthetic indicators developed for each programme, presentation and discussion of draft Best Practice User Guidelines and presentation and discussion of the TEVI interface. The presentation of synthetic indicators per programme led to lively discussions on the results of programmes presented by some indicators. The second part of the workshop started with presentation of the contents of the guidelines and was followed by discussions on the contents as well as feedback. In the final part discussion and feedback of the presented prototype of TEVI tool took place.

The results provided by the synthetic indicators stimulated discussions. The methodology of the indicators was mildly criticized due to the fact that they did not solve some of the problems of current indicators. Regarding guidelines, stakeholders welcomed the approach that emphasizes the importance of the intervention logic as well as setting of specific objectives based on appropriately identified needs of the programme area. It was emphasized that these aspects are very relevant and important to selection of result indicators and should be further developed in the guidelines. The TEVI tool was deemed useful in establishing the socioeconomic baseline of programmes.

3 The Territorial Evidence Interface

3.1 Background and current status

Initially, the TEVI project aimed to produce a webtool which would be a common feature at the website of keep.eu and ESPON. In the course of the project, however, discussions between the consortium, ESPON EGTC and keep.eu gradually led to the conclusion that the tool should not be linked to keep.eu at the present moment. Due to delays resulting from the exchange and modifications of the definition of the tool and its requirements, the delivery of the final tool is shifted to D4 (13.08.19), while in D3 its prototype is presented. This ensures a longer trial period as well as more time for ESPON EGTC and INTERACT to provide feedback.

The development of the tool has been agreed to proceed as a standalone feature, future-proofed for any potential future integration. This necessitated the usage of Drupal architecture by the project team in the development process, as well as Google Maps. Using Google Maps requires ESPON or the EPSON Service Provider to obtain Google API Key.

The prototype of the tool is accessible under the following link¹.

3.2 Description of the functionalities

Application layout

The TEVI tool features a 2-screen layout, with a main screen that allocates all the functionalities being developed, and a welcome screen as the default point of entry to the web. This way, in case of future integration with KEEP website, welcome screen can be dropped and the main screen can be easily integrated as a new tab in Keep web application.

Welcome Screen

The welcome screen features a text explaining the user the general aim of the tool and a “continue” button which leads them to the main screen. Optionally, an image or image carousel can be added.

The following text is presented to the user:

```
(header>Welcome to Territorial Evidence Support for ETC Programmes(/header)
(body)The Territorial Evidence Support for ETC Programmes Project represents a common effort by
ESPON EGTC and Interact to develop a new set of territorial indicators and evidence, guidance on
programming, as well as an interface connecting ESPON Scientific Database and keep.eu.
This interface provides territorial information to the user via comprehensive mapping features and other
data visualisation methods, such as charts and graphs. It allows the visualisation of indicators from the
ESPON Scientific Database via times series graphs and maps on NUTS-3 scale. Visualised information,
as well as the underlying raw data, can be exported in easily accessible formats. Furthermore, custom
data can be mapped by the user via an upload function.(/body)
```

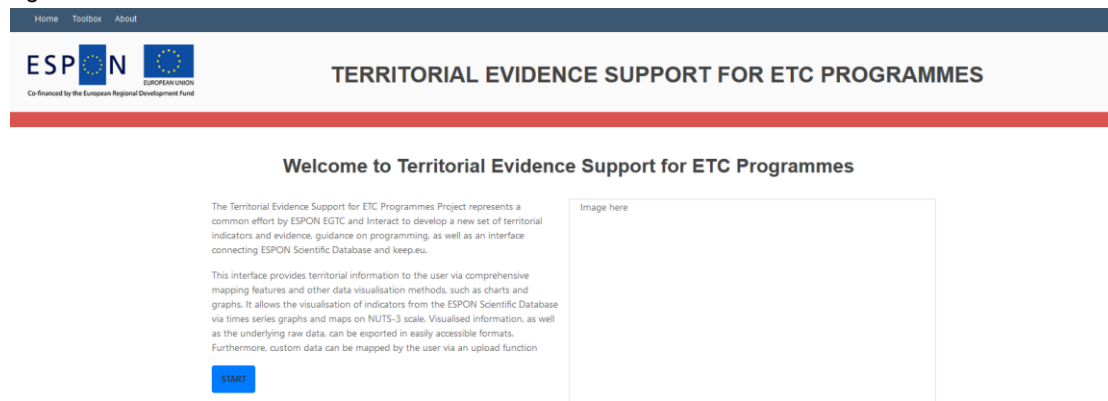
¹ <http://217.160.143.48:8080/tevi>

Header and footer styles and colour scheme follow ESPON guidelines to maintain visual integration with the rest of ESPON tools.

Main screen

The main screen of the TEVI interface presents its main functionalities. A snapshot is provided below.

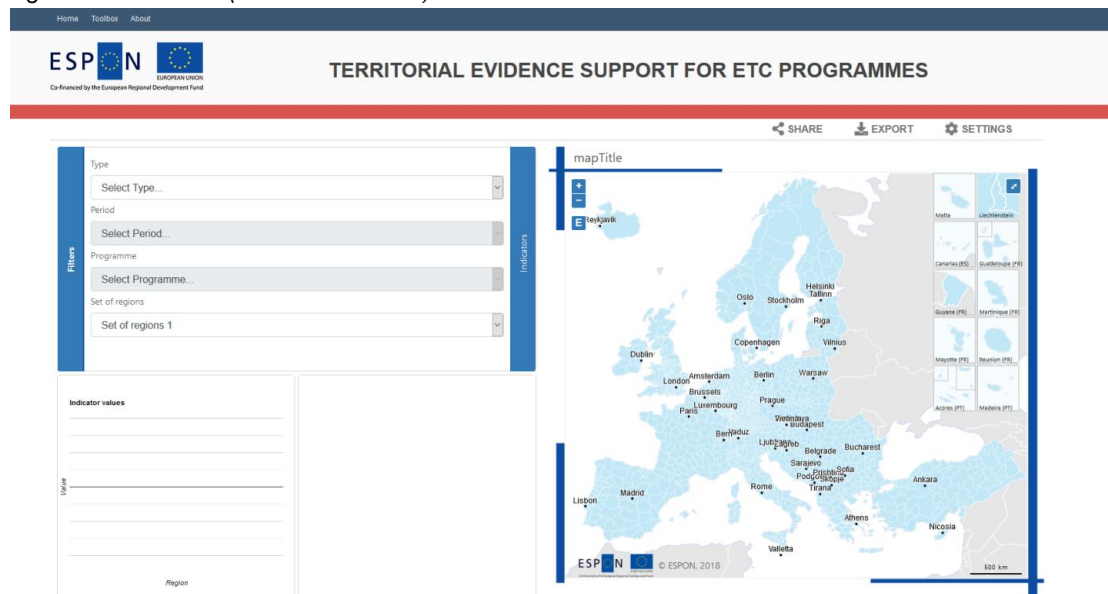
Figure 3.1: Main Screen



Source: Consortium, 2019.

Interface Screen

Figure 3.2: Interface (Selection “Filters”)



Source: Consortium, 2019.

After passing onto the interface via clicking the “start” button, the user is greeted with the interface. The buttons “Filters” and “Indicators” allow the user to access additional functionalities.

Programme selection

The user may select the appropriate programme from a dropdown list. Filters such as programme type, period or others are implemented to narrow the list to a more user-friendly size. Set of regions can be selected as well.

Time Series Area

This area shows a chart with a time series of all regions average. Chart is clickable, and selecting a particular data shows the detail of the selected year/period on both the charting area and in the map area.

Charting Area

Several charts are shown in this area to better visualize the data, including a time-series showing the evolution of the indicator’s data by year/period. Clicking a year/period on this chart showd its detailed data in the other charts, as well as in the map.

Map Area

Map wshows the regional data of the selected indicator/combination and year/period. The usual map features such as legend, zoom, pan, region highlight with data details and region selection are available.

Map functions

In this area, several functions are available to the user, such as map/chart exporting, sharing and any other, should they come up in the future.

A legend is shown, which can be exported via the tool, to let the user identify indicator selection at a later point in time. The template is as follows:

[Programme Name], [Year]: [per indicator/component] with [Name of Indicator] in [Year] weighted at [respective weight], with [Name of Indicator] in [Year].
Additional regions selected: [per additional region] [NUTS-3]

Menu Bar

- Settings: To select the colour scheme, with various settings. Colours and colour ranges can be selected, as well as their respective breaking points.
- Export: To export the map or the charts into a .pdf or .png.
- Share: To share a link with the specifications through mail or social media (twitter, Facebook or Google+).

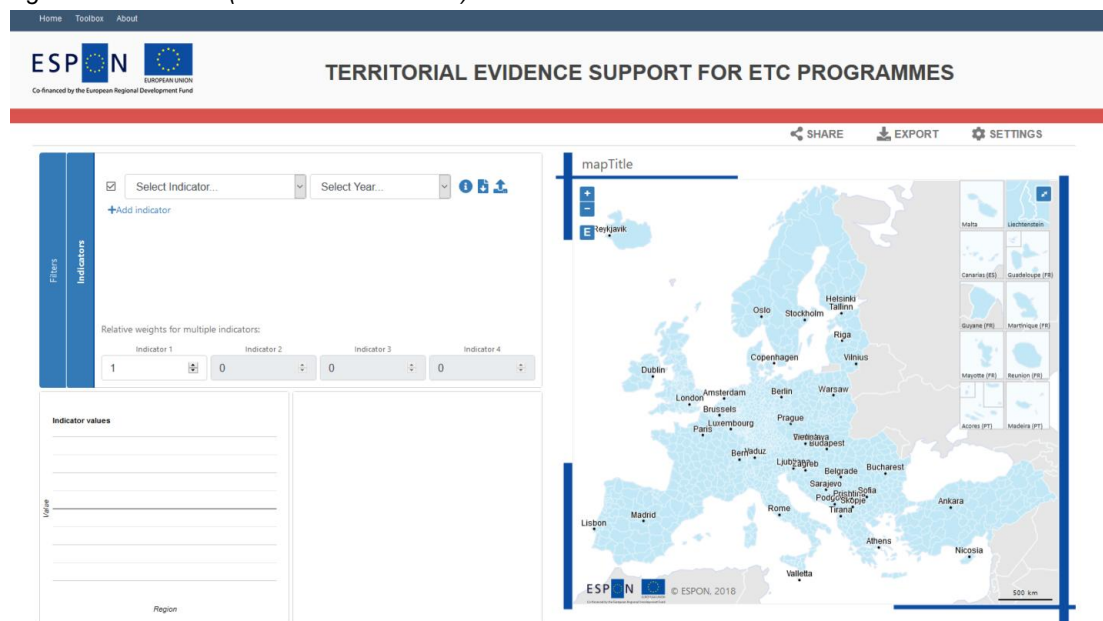
Indicator selection

Once programme is selected, user needs to select relevant indicators. An indicator selector shows up, with an “Add” button that allows the user to add more (to a certain limit, to be

discussed). New indicators are added below each other, together with a “delete” icon, which enables deleting.

Finally, the user selects what they want to visualise in the map/charts, either a single indicator (marked by the radio button next to each selector) or a combination (such as aggregation, correlation or any other that will come up in the future) of several of them.

Figure 3.3: Interface (Selection “Indicators”)



Source: Consortium, 2019.

Component Weights

Users have the option to adjust the individual weights of the components in a pop-up window. This window allows the user to adjust the weights of the called-up indicators between. The weights across all components sum up to 1.

$$\frac{1}{x_1} * indicator_1 + \frac{1}{x_2} * indicator_2 + \dots + \frac{1}{x_k} * indicator_k, \text{ with } \sum_{k=1}^{\infty} x_k = 1$$

Functionalities

Domain		
Data	Programme selection	Selection takes place in three steps: 1.Type 2.Period 3.Programme selection
Data	Indicators Selection	Only indicators of the selected programme are available Several indicators can be selected
Data	Function selection	Select to show data of any single indicator or combined data of several of them. Users can adjust the weights of the individual components via a pop-up (Section 2.2.8), as well as selecting the preferred year via a drop-down menu under “indicator selection”.

Domain		
Data	Data Import	Users are able to upload data from a preset excel template on NUTS-3 scale to visualise custom indicators
Data visualization	Hover Region	Regions can be remarked (increasing its bright in the map and the graph) by hovering over them. A tooltip with the name and code of the region and the value of the data is displayed.
Data visualization	Select Region	Regions can be selected on NUTS-3 level via a filter menu. This allows the user to customise the selection of regions.
Data visualization	Select Region	Regions can be selected (increasing its bright in the map and the graph) by clicking over them. This will show the time series of that particular region.
Data visualization	Geometry Levels	Layers are from NUTS0 to NUTS3 geometries are present and appropriate layer for the data detail level of the selected indicator will be shown.
Data visualization	Time series	Time series of the selected indicator/combination are shown.
Data visualization	Time series selection	Clicking on a data shows that years/period data detail in map and charts
Data visualization	Full Screen	A maximize button is included in the map area.
Data visualization	Map Zoom	Map Zoom in/out is available through buttons or mouse.
Data visualization	Map Pan	Map Pan is available through buttons or mouse.
Data visualization	Maps and graphs Colours Scheme	The user is able to adapt the colour scheme of the map via a pop-up tool. This allows the user to select the colour and colour range, as well as break point. The colour scheme applies across all maps and graphs.
Data visualization	Bar Chart	Regional data of selected indicator/combination is shown as bar chart.
Data visualization	Pie Chart	Regional data of selected indicator/combination is grouped by value category and shown as pie chart.
Data visualization	Legend	A legend is included to inform the user on the selection of indicators, programme, years and similar. A template is provided in section 2.2.6.
Output	Share	User is able to share the map with a link through email or social networks.
Output	Export	User is able to export the map and or charts made as a file in various formats such as pdf, jpg, png.
Output	Export	Users is able to share a static link of the visualised data (note: this does not extend to uploaded data)
Output	Export	User is able to export the source data used to create the indicators in .xlsx format. Data is exported on the individual components and the aggregated indicator. A button is placed next to indicator selection, allowing the data download of the respective indicator. (Figure 3: Indicator Selection)
Guidelines		User Guide available in .pdf format.

Source: Consortium, 2019.

3.3 Development steps ahead

Following the delivery of the prototype of the Territorial Evidence Interface, the web-tool will be tested by ESPON EGTC and INTERACT, as well as the participating programme stakeholders. A trilateral talk is foreseen in order to provide feedback as well as discuss further necessary developments and alternations on 15 April 2019. Once the functionalities of the tool are approved after D3 (12 April 2019), the link between the EPSON Scientific Database and the tool will be constructed, to allow data visualisation. Once the link is ready, the tool will undergo a second round of testing.

Based on the discussions, the consortium will develop the final version of the web-tool to be delivered in D4 (13 August 2019).

4 Steps ahead

The participatory process culminates in several outputs as presented in Figure 1.1: Outcomes of the ESPON TEVI project. The Best Practice User Guidelines are the most relevant output which records the methodology and approach of the project in aiding INTERREG stakeholders to assess and select result indicators.

The draft of Best Practice User Guidelines is delivered in third delivery to ESPON. Based on the feedback from ESPONG EGTC as well as stakeholders of involved programmes, final version of the document will be prepared. After finalisation of the Best Practice User Guidelines, it is foreseen that the guidance will be disseminated to stakeholders of not only the twelve involved programmes but also to stakeholders of all INTERREG programmes.

4.1 Feedback Collection

The Best Practice User Guidelines, the Prototype, and the Territorial Evidence Reports will be validated with the help of the participating programme stakeholders via structured telephone interviews. The Best Practice User Guidelines, the Prototype, and the Territorial Evidence Reports are scheduled to be disseminated to the participating programme stakeholder in early to mid May (depending on approval by ESPON EGTC). The programme stakeholders will be interviewed along a structured questionnaire on topics such as the relevance, ease of understanding, and accessibility of the thematic content presented.

The outcomes of the interviews will be an assessment of the interview minutes and potential amendments to better address stakeholder needs.

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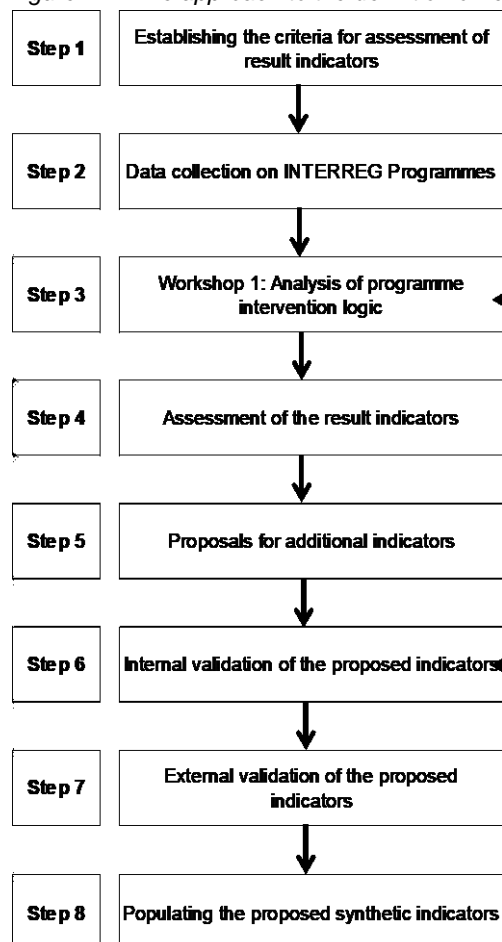
Annex: Development of Key Territorial Indicators

Methodological approach

Task 2 of the project concerns the proposal of result indicators for the INTERREG Programmes considered. The methodological approach to the selection of the result indicators includes seven steps, as represented in Figure A.1.

The methodology presents a first conceptual step in which, based on previous literature, clear, transparent and logic criteria are defined according to which result indicators should be selected. On the basis of the collection of information on intervention logics for each specific objective (step 2) and their discussion with stakeholders in step 3, the result indicators are assessed in step 4 based on the criteria chosen. This assessment will inform about the most relevant weaknesses of the result indicators currently available, so to indicate where and how to intervene with additional proposals (step 5). The additional result indicators will therefore be identified in step 6.

Figure A.1: The approach to the definition of result indicators.



Source: Consortium 2018

The assessment of the current result indicators and the proposal of new ones is the result of a participatory process between the partners of the project and the stakeholders of the Programmes involved. The selection of indicators is first discussed among partners of the

project; in step 6 the output of a preliminary assessment and definition of new result indicators is discussed internally with experts based on the findings from the first workshop. In a following step (step 7), the whole output is validated by the stakeholders of the Programmes involved, during the second workshop.

This approach is highly integrated with the workshops undertaken with the stakeholders. The first workshop informs the research team about the intervention logic of the Programmes, providing inputs for the assessment of the proposed result indicators. In the second workshop a first proposal for the additional result indicators is presented and discussed with the stakeholders, in order to validate the new indicators and/or apply necessary modifications agreed on during the workshop.

In the next section each step of the approach is presented and carefully discussed.

Step 1: Establishing the criteria for assessment of result indicators

The definition of appropriate result indicators is crucial for the monitoring of policies and the setting of future interventions. “Appropriateness” is, however, a vague concept, highly dependent on a multifaceted set of characteristics and properties of the indicators. Stemming from the broad debate on these issues (Barca and McCann, 2011), this step presents the developed *methodological framework for the assessment of result indicators*, from their definition to their empirical measurement. More in details, a set of characteristics based on which it will be possible to assess the appropriateness of the result indicators currently used by the INTERREG Programmes is proposed. Based on this assessment, whenever needed, alternative indicators are suggested.

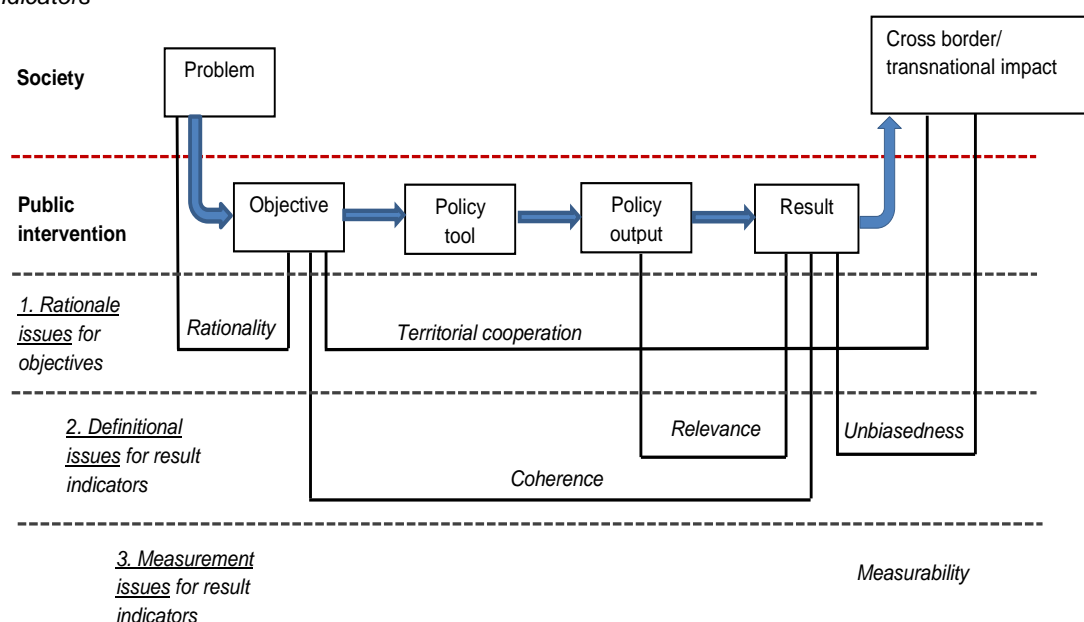
The first step for the criteria with which the selection of the indicators could be based, is starting from the already existing literature on such issue. In the words of the European Commission (EC) itself (EC, 2014, p. 4), a policy result “*is the specific dimension of well-being and progress for people that motivates policy action, i.e. what is intended to be changed, with the contribution of the interventions designed*”. Therefore, result indicators measure this direct, immediate change. This definition is particularly useful since it allows understanding how policy results are strictly linked with the objectives set by the policy itself and by the actions undertaken to reach them.

This conceptual chain joining together the problem to the impact through policy implementation is graphically represented in Figure A.2.

The first element of the logical framework is the occurrence of a *problem* in a given socioeconomic field, calling for public intervention (Figure A.2). The *objective* of the public intervention is directly aimed at addressing and overcoming a certain societal need. In order to achieve its goal, public intervention will choose a *policy tool* for the implementation of specific actions (the *outputs*) which, in turn, will lead to some *results*, meant as the contribution of the policy to the achievement of the objectives defined. Result indicators measure project results relative to project objectives, as they monitor the progress towards

the explicit targets defined in the beginning of the logical chain (Mosse and Sontheimer, 1996).

Figure A.2: The logical model of public intervention and the criteria for the definition of appropriate result indicators



Source: adapted from Osuna et al. (2000)

For the appropriate measurement of the results, the first very important aspect to take into account is that the project objectives are defined in a clear and unambiguous way, fitting properly the problem they are related to. If this is not the case, it would not be possible to meaningfully measure the progress towards the targets of the policy, since the targets themselves would not be clear. The first issue in the identification of appropriate result indicators is defined as the *rationality* of the policy objective (Figure A.2). Rationality measures the level of understanding, transparency and accurateness of the policy objectives relative to the societal problem addressed.

In the case of INTERREG Programmes, policy objectives are characterised by a specific aspect. These kind of interventions implement joint actions and policy exchanges between national, regional and local actors from different Member States. They are aimed at generating territorially integrated objectives (either cross-border, transnational or interregional), able to promote a harmonious socioeconomic development of regions. Therefore, the dimension of territorial integration among Member States represents the peculiarity of INTERREG actions, differentiating them from policies undertaken by regional and national authorities. The latter, in fact, are usually defined just considering the consequences of the policy on the part of territory included within the borders of the region/country where the action is implemented. Potential externalities outside these borders are generally not accounted for. INTERREG Programmes, on the other hand, explicitly operate on the integration of border areas, focusing on objectives that cannot be efficiently addressed by regional and national policies. It is therefore necessary for these objectives to

have a clear focus on *territorial cooperation*, i.e. it must be evident that the INTERREG Programme is not just a substitute for a policy of any other kind (either regional or national) but, rather, its goal is strictly focused on a cross-border territorial dimension.

It is important to note that these concerns about both rationality and territorial cooperation are not directly related to the result indicators but, rather, to the objective that motivates the policy action. In other words, these issues are preliminary to the definition of result indicators but, nevertheless, fundamental for their identification.

Once the objective of the policy is correctly defined, the logical chain enters the phase of the implementation of the public actions, leading to the results through the choice of tools and the generation of outputs. As discussed above, results are measured at the level determined by a project's objective. As a consequence, result indicators must be fully consistent with the objectives of the policy, as they have to correctly measure the targets set by the public intervention. In other words, there is an issue of *coherence* linking objectives and result indicators (Figure A.2): if a mismatch arises between these two elements, the monitoring of the policy achievements would be flawed and arbitrary.

At the same time, it is important for the result indicators to capture a result of the project, rather than an output. The difference between outputs and results must be made explicit, in order to avoid confusion between the two concepts. Outputs are the products generated by the policy in order to achieve certain results. In this sense, the output is not the final goal of the policy, but rather the mean through which the policy objective is pursued (OECD, 2009). The results, on the other hand, represent the extent to which the objective of a policy has been achieved. For instance, a transportation policy could involve the investment of some funds (tools) for the building of a new highway (output) in order to decrease travel time of commuters (result). A policy for unemployed people could invest public resources (tools) for the organization of training courses (output) which will make it easier the reintegration in the job market (result). The *relevance* of result indicators (Figure A.2) measures the extent to which the indicator is capturing a result rather than an output.

The last logical link in Figure A.2 links the results of the policy to its impact on the society (Hempel and Fiala, 2011). The policy impact is defined by the long-term effects on specific dimension of well-being and living standards of the population targeted by the policy (McCann and Ortega-Argilés, 2015). These long-term effects depend on a variety of different factors, most of them not under the control of the policy maker (World Bank, 2004). The policy results, on the other hand, are short or medium-term effects, directly resulting from the outputs generated by the policy. In other words, the causal link between policy results and impacts is not as evident as the one between outputs and results. It is therefore extremely important, for the result indicators, to capture the *net* effect of the policy actions on the defined targets, obtained when the result is free from, and *unbiased* with respect to, other on-going actions and processes.

If *rationality* and the focus on *territorial cooperation* represent the prerequisites for the definition of the result indicators, since they relate to the specification of the policy objectives, *relevance, coherence and unbiasedness* refer to the appropriate definition of result indicators, and therefore they another conceptual level with respect to rationality and territorial cooperation in the logical framework showed in Figure A.2.

Once result indicators are defined in terms of rationality, territorial cooperation, relevance, coherence and unbiasedness, the logical approach moves to a third level, concerning the *empirical measurement* of the indicators and the potential issues involved in this phase (Figure A.2).

Moving from the general definition of a result indicator to its empirical measurement implies some critical issues. These issues are generally defined under the label of *measurability* in the logical framework of Figure A.2, as they refer to several criteria on which the selection for the best measurement of a certain result indicator should be based. The criteria have to reflect specific characteristics that results indicators should have. Results indicators should in fact be:

- *objective*: results have to be measured in an objective way. They have therefore to be as un-sensitive as possible to different methodologies and approaches for their collection, and have to provide a straightforward interpretation of the change occurred. In this sense, quantitative indicators are preferable to qualitative ones;
- *consistent over time*: since result indicators should monitor the gradual approach towards the specific targets set by the policy maker, it is important for their empirical measurement to be regularly available over time, without long time lags (Schumann, 2016).
- *comparable*: to the broadest extent possible, indicators should allow a comparison with other policy contexts, so to understand whether the change occurred is more or less relevant.
- *available at affordable prices*: since the collection of indicators is a costly procedure, especially for qualitative data such as surveys and focus groups, the budget devoted to the measurement phase has to be carefully planned. Whenever possible, without decreasing the quality of indicators, existing data sources should be used for this purpose (OECD, 2015).

These criteria should be adopted for i) assessing the indicators currently proposed by the INTERREG Programmes considered and ii) proposing new, additional indicators whenever needed. They are also described in the Best Practice User Guidelines.

Step 2: Data collection on INTERREG Programmes

The assessment of the result indicators currently proposed within the investigated INTERREG Programmes is based on the criteria defined in Step 1.

It is therefore necessary, first of all, to build a data set on the specific objectives and the corresponding result indicators of the INTERREG Programmes considered in order to understand the intervention logic of the programme. This data set will have the structure reported in Table A.1. Objectives are organized according to a hierarchical structure, from the

more general (the EU Strategic pillars) to the thematic objectives defined for the relevant programming period (in this case 2014-2020), to the specific goals of the identified by the Programmes. As the goal of this step is also to reconstruct the intervention logic of the programme, the table includes a column on the relevant territorial need that is to be addressed with the programme specific objective and measured by the result indicator.

Table A.1: Structure of the data set on Programme objectives and proposed result indicators, in cas.

EU Strategic Pillar	Thematic objective	Relevant territorial need	Programme specific objective	Proposed result indicator
Smart Growth	1. Strengthening research, technological development and innovation			
	2. Enhancing access to, and use and quality of information and communication technologies (ICT)			
	3. Enhancing the competitiveness of small and medium-sized enterprises (SMEs)			
Sustainable Growth	4. Supporting the shift towards a low-carbon economy in all sectors			
	5. Promoting climate change adaptation, risk prevention and management			
	6. Preserving and protecting the environment and promoting resource efficiency			
	7. Promoting sustainable transport and removing bottlenecks in key network infrastructures			
Inclusive Growth	8. Promoting sustainable and quality employment and supporting labour mobility			
	9. Promoting social inclusion, combating poverty and any discrimination			
	10. Investing in education, training and vocational training for skills and lifelong learning			
	11. Enhancing institutional capacity of public authorities and stakeholders and efficient public administration			

Source: Consortium, 2019

Step 3: Workshop 1: Analysis of programme intervention logic

The focus of the first workshop is to expose the intervention logic of the programme by discussing identified needs as well as how well they are addressed by selected objectives

and how successfully they are measured by proposed result indicators, based on findings of step 2. This allows the participants to discuss the specificities of capturing the links between interventions and results via indicators.

Participants are presented with intervention logics for each of the identified objectives in a world café setting. Finally, in a moderated feedback session, participants should provide comments on the intervention logic.

The goal of this exchange is to allow experts to be better equipped with understanding of the intervention logic behind each objectives for assessing and proposing result indicators in steps 4 and 5.

Step 4: Assessment of the result indicators

Once the data set is finalized, the experts assess the result indicators according to the criteria identified in Step 1. Experts assign a score to each of the criteria reported in Table 4.1, in order to point out the weaknesses and strengths of the approach undertaken within each Programme. The sequence of the assessment follows the three logical levels depicted in Figure A.2, as follows.

In the first place, the rationality and the focus on territorial cooperation of the specific objective are evaluated, i.e. the consistency between the objective of the Programme and the problem that the public intervention is addressing and the focus of the Programme's objectives on territorial cooperation issues. A deep understanding of the intervention logic is crucial in this context, and the assessment makes use of both the findings from the Step 2 from the first workshop with the stakeholders, where the specificities of the territorial cooperation and the needs are discussed.

After having reached a clear and full understanding of the specific objective of the Programme, the assessment will involve the second group of criteria, i.e. those relevant for the definition of the result indicators. Each result indicator will therefore receive a score for its level of coherence, relevance and unbiasedness. It is worth pointing out that these criteria are totally independent from each other, since they involve the relationship between policy results and different elements of the logical framework reported in Figure A.2.

Finally, since the result indicators defined within INTERREG Programmes include also the source of the data, the last phase of the assessment will focus on the measurability of these indicators.

Table 4.1: The assessment of proposed result indicators.

EU Strategic Pillar	Thematic objective	Relevant territorial need	Programme specific objective	Proposed result indicator	Rationality	Territorial cooperation	Coherence	Relevance	Unbiasedness	Measurability
Smart Growth	1				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
	2				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
	3				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
Sustainable Growth	4				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
	5				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
	6				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
	7				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
Inclusive Growth	8				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
	9				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
	10				xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
					xxx	xxx	xxx	xxx	xxx	xxx
11				xxx	xxx	xxx	xxx	xxx	xxx	
				xxx	xxx	xxx	xxx	xxx	xxx	
				xxx	xxx	xxx	xxx	xxx	xxx	

Source: Consortium, 2019

A general score will return a summative evaluation for the four aspects defined above, i.e. the objectivity, consistency over time, comparability and availability at an affordable price of the result indicators.

This assessment will provide us with two kinds of results.

At a more general level, an understanding is reached on whether there is any recurrent limitation in the choice of result indicators. In other words, the assessment will suggest if the

fulfilment of specific criteria is more critical than others. In this way, different types of criticisms in the intervention logic of the programme are evaluated. In fact, poor levels of either rationality or territorial cooperation will probably call for a deep reasoning on the objectives and, as a consequence, results of the public intervention, while a low score in the measurability will require a revision of the indicators suggested, without putting in doubt neither their definition nor their consistency with the policy objectives.

The assessment of result indicators also allows to show whether there is any best practice for their definition. This issue is particularly interesting because, for example within the sample of 12 Programmes analysed by the TeVi project, some programmes were launched recently while some others were already active in the past Programming Periods. Moreover, some programmes (INTERREG A) are focused on geographically proximate regions, while others (INTERREG B) are spanning over a much broader area of intervention, leading to the question whether the geographical structure of projects is associated to the appropriateness of the result indicators proposed.

The final goal of this step is to inform the definition of additional result indicators, as it will be discussed with more details in the next section.

Step 5: Proposals for additional indicators

The assessment analysis conducted in step 4 allows understanding where the most important limitations are concentrated and, as a consequence, how they can be overcome. In other words, the evaluation analysis points out the specific objectives for which additional indicators would be particularly useful, due to the weaknesses of the current ones. At the same time, it underlines on which criteria the new result indicators should bring an improvement, helping therefore to identify their most appropriate definition and measurement.

The final outcome of step 5 consists in a table with the structure of Table 4.2. As for the previous step, the logical sequence adopted for the proposal of new indicators will be consistent with the three logical levels reported in Figure A.2.

Therefore, in the first place, the Programme specific objectives are revised, whenever needed due to a low score for the rationality and territorial cooperation criteria (Table 4.2). Once the intervention logic of the Programme and its objective is fully clear, proposals for additional result indicators are formulated and reported in the second column of Table 4.2. These proposals should fulfil as much as possible all the criteria of relevance, coherence and unbiasedness discussed above.

Among these three criteria, coherence and unbiasedness pose however some relevant concerns which, in order to be overcome, may require some further theoretical and methodological reasoning.

The coherence criterion calls for *synthetic indicators*, defined as a combination of simple indicators, in that coherence may call for a series of result indicators, according to the different results that one single policy action can generate. In fact, according to the coherence

criterion, the definition of the results (and therefore the result indicators) must be consistent with the specific objective of the Programme, which can be more than one for each single policy goal. The way in which the simple indicators are combined is suggested here to be made dependent on the weight that each policy maker attributes to each policy goal: a weight will therefore be assigned to each indicator, proportional to the emphasis that the policy makers attribute to the different results. An example of such way of proceeding is presented in the box below.

Box A.1: Example of the sources and creation of a synthetic indicator

An example of a multi-result policy action is represented by public intervention focused on the promotion of cultural heritage in order to foster the cultural participation of the population, where policy outputs might be represented by gentrification projects in the urban centres. A policy of this kind is expected to generate, as a result, a higher level of participation of the resident population in the cultural life of their city, in terms for instance of museums and monuments attendance. At the same time, however, it might induce an increase in tourism presences. Notice how these two results are not mutually exclusive, even if a trade-off could occur at high levels of tourism density. A synthetic indicator could be calculated, measured as a combination of two simple indicators as, for instance, museum attendance of the resident population and tourism presences. A weight will be attached to each of these simple indicators, each of the weights defined between 0 and 1 and summing up to 1. The definition of the weights will depend on the objectives of the Programme: a value close to 0 associated to tourism would mean, for instance, that the objective of the Programme is entirely focused on the behaviours of the resident population, while a value close to 1 would imply that the goal of the policy is more orientated towards fostering economic growth through tourism.

Table 4.2: Structure of the data set on the additional result indicators proposed by the TeVi project.

		1. Proposed solutions to rationale issues	2. Proposed solutions to definitional issues	3. Proposed solutions to measurement issues
EU Strategic Pillar	Thematic objective	Programme specific objective (revised where needed)	Definition of the additional result indicator	Empirical measurement of the additional result indicator
Smart Growth	1			
	2			
	3			
Sustainable Growth	4			
	5			
	6			
	7			

		1. Proposed solutions to rationale issues	2. Proposed solutions to definitional issues	3. Proposed solutions to measurement issues
EU Strategic Pillar	Thematic objective	Programme specific objective (revised where needed)	Definition of the additional result indicator	Empirical measurement of the additional result indicator
Inclusive Growth	8			
	9			
	10			
	11			

Source: Consortium, 2019

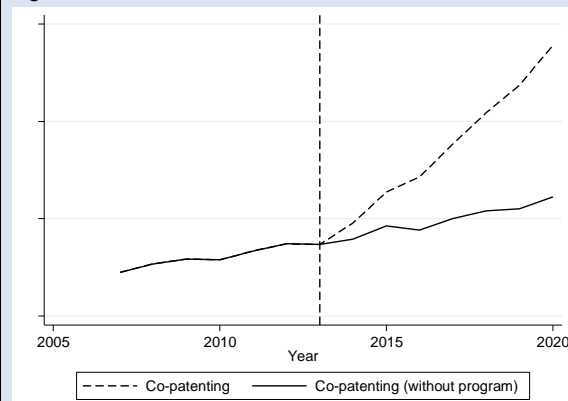
The unbiasedness criterion calls for another methodological accuracy. The goal of result indicators is to capture the *net effect* of the policy actions on the defined targets, unbiased with respect to other on-going actions and processes, as some result indicators may be influenced by events external to the public intervention. An example is represented by policies focused on the promotion of R&D activities, aimed at reinforcing the regional specialization in advanced technological sectors, where the policy outputs might consist of funding opportunities to firms launching collaborations in innovative fields. A possible result indicator could be represented by the registrations of new patents. This indicator, however, is likely to be biased by other factors, such as the current R&D expenditure of firms, the demand for technological goods, etc.

In order to capture the net effect of the policy, the result indicators should go through a methodology which guarantees the net effect to be accounted for. This methodology is called *difference-in-difference (DID)* (Bertrand et al., 2004). Such a methodology is based on a comparison between two kinds of units of observations (in this case, regions): those treated by the policy and another group of regions fully comparable for all the relevant characteristics (as, in the previous example, firms' R&D expenditure and demand for technological goods) but not treated by the policy. The difference between the two groups of regions provides the net effect of the policy on the result indicator.

Box A.2: Technical aspects of DIFF-in-DIFF methodology

A diff-in-diff procedure (Bertrand et al., 2004) looks for units of observations (in this case, regions) identical to the regions being funded by a given program, other than for receiving funds. The development of a given output indicator is observed against otherwise identical regions that do not receive funding. In Figure A.3, the intensity of co-patenting between regions belonging to the MED INTERREG is simulated in the case of the existence of the program, i.e. 2014, and without). Thus, the methodology allows to disentangle the effects of a program from other confounding factors (in this example, other determinants of co-patenting such as R&D expenditure), thus allowing to safely identify actual result indicators, i.e. indicators that are indeed linked to each program.

Figure A.3: Simulated effect of the MED INTERREG program on transnational activity in innovation



After first selecting a set of suitable indicators, and verifying their potential suitability to act as result indicators through the workshops, we will verify by means of the Diff-in-Diff estimates on all potential result indicators that are quantitatively available for all involved regions whether they can actually be related to the programs. Only those that are indeed found to be due to the programs will be included in the final list of result indicators.

For the calculation of composite indicators the individual indicators should ideally follow a normal distribution. Some of the KEEP and ESPON indicators are fractional indicators with values between 0% and 100% and some of these do follow a normal distribution. Some indicators are however unbound indicators, where values are not limited to an upper threshold. These indicators can have asymmetrical or skewed data distributions (where most regions show low performance levels and a few regions show exceptionally high performance levels).

For all indicators to be developed, data will be transformed using a square root transformation if the degree of skewness of the raw data, a measure of the asymmetry of the distribution of the data, exceeds 1, such that the skewness of the transformed data is below 1.

Following this transformation, the data are normalised using the min-max procedure. The minimum score observed for all regions across all five observations is subtracted from the respective transformed score, which is then divided by the difference between the maximum and minimum scores observed for all regions across all five observations. The maximum normalised score is equal to 1 and the minimum normalised score is equal to 0.

Source: Consortium, 2019

The DID method, as well as a simpler, qualitative alternative is described in the Best Practice User Guidelines.

Summing up, the use of *synthetic indicators* and *DID* procedures will be adopted whenever needed in order to guarantee, respectively, coherence and unbiasedness of the result indicators proposed. Once the definition of the additional result indicators is provided (column 2 in Table 4.2), the last phase concerns the identification of the most appropriate empirical measurement.

The indication of the source for the empirical measurement is therefore reported in column 3 of Table 4.2. The choice of the measurement is based on the four principles classified under the label of measurability. In general, a preference will be given to quantitative indicators regularly provided by official statistical sources like Eurostat, ESPON, OECD and World Bank. This choice is based on the fact that data of this kind typically owns all the characteristics required by an appropriate empirical measurement. Coming from official statistics, they are objective, as they refer to phenomena observed and classified following the same procedures and principles across countries. In most cases, they are provided for long time periods and for a high number of regions, so they allow comparability both over time and across territories

with different characteristics. Finally, the access to these data is generally free or subject to relatively low prices for the access.

As far as the measurement is concerned, one relevant issue involves the *geographical units* to be used. Data on the result indicators will be collected at the finest administrative units available, which is generally the NUTS3 level, since in this way the possibility to capture the local effects generated by the policy is increased.

In order to calculate the result indicator referred to the whole Programme area, however, a process of *data aggregation* must be adopted, being Programme areas made up by several NUTS3 regions. Since the intensity of the Programme actions is not the same across the eligible NUTS3 regions, the aggregation process is not given by the simple mean of the regional values but, rather, by a weighted mean, where the weights are set proportionally to the funds received by each region within the Programme. In this way the result indicator for the Programme area takes into account the uneven intensity of the policy within the eligible area.

Step 6: Internal validation of the proposed indicators

The output represented by Table 4.1 and Table 4.2 should go through a process of internal validation for what concerns both the current and the additional result indicators. In such a process, other experts provide their impressions, comments and feedback jointly, whenever applicable, with a list of possible alternative (and improved, according to the criteria defined in section 2.2) indicators if they are aware of their existence and availability. The discussion within the research team is useful in order to improve the appropriateness of the indicators selected. This step is particularly important if other experts attended the workshops included in the first round of meetings with the stakeholders.

Finally, the process of internal validation will makes experts equally aware of the criticisms moved to the current result indicators and of the criteria behind the definition of the additional ones. This aspect is crucial in the management of the second workshop, where the results regarding developed indicators are discussed to the stakeholders.

Step 7: Workshop 2: External validation of the proposed indicators

Step 7 concerns the external validation of the indicators. This validation will take place during a second workshop with the stakeholders. The experts responsible for the organization of the workshop will present to the stakeholders the results of the previous part of the task, with a particular attention on the definition of the additional indicators. The discussion with the stakeholders should focus on the extent to which, according to their opinion, the new indicators capture the objective of the Programme and allow overcoming the main limitations observed in the result indicators already available.

This step is fundamental in order to validate the whole procedure for the definition of result indicators, from the identification of the criteria and the subsequent assessment to the choice of the most appropriate empirical measurements.

Should discussions during workshop lead to a need to modify the indicators, experts should undertake necessary modifications before finalizing the list and populating the indicators.

Step 8: Populating the proposed synthetic indicators

Gross Value Added in Knowledge-Intensive Sectors

The synthetic indicator is composed of several sub-indicators which are individually picking up characteristics of the overall territorial dimensions in the framework of knowledge-intensive economic activities. The indicator is calculated in the following manner:

$$GVA_{i,t} = \frac{1}{2} * Y_{i,t} + \frac{1}{2} * E_{i,t}$$

In which the variable $Y_{i,t}$ represents normalised gross value added by knowledge intensive industries in region i and at time t , Analogously, $E_{i,t}$ represents normalised employment in a given region i and at time t . Each of the variables are normalised in the following manner, across the programme region and across ESPON Space. The individual values are scaled up by a factor of 100 to aid with the ease of interpretation.

$$E_{i,t} = (e_{i,t} - \min(e_{i,t})) / (\max(e_{i,t}) - \min(e_{i,t}))$$

As data sources, Eurostat data is used. Gross value added by knowledge intensive industries is represented by the indicator *Gross value added of financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities*² of the NACE data set and the corresponding employment indicator of the NACE data set for the same economic activities³

Innovation

The synthetic indicator is composed of several sub-indicators which are individually picking up characteristics of the overall territorial dimensions in the framework innovative economic activities. The indicator is calculated in the following manner:

$$Innovation = \frac{1}{2} * P_{i,t} + \frac{1}{2} * T_{i,t}$$

In which the variable $P_{i,t}$ represents normalised patent application values per NUTS-3 region to the European Patent Office in region i and at time t . Analogously, $T_{i,t}$ represents normalised trademark applications in a given region i and at time t . Thus, the indicator captures scientific and technical innovation, in addition to capturing process innovation via new products and similar by companies. Each of the variables are normalised in the following manner, across the programme region and across ESPON Space. The individual values are scaled up by a factor of 100 to aid with the ease of interpretation.

²nama_10r_3gva

³nama_10r_3empers

$$P_{i,t} = (p_{i,t} - \min(p_{i,t})) / (\max(p_{i,t}) - \min(p_{i,t}))$$

As data sources, Eurostat data is used. As EPO patent applications per NUTS-2⁴ were discontinued after 2012, data transformation methods were used to obtain more recent proxy values. The indicators were broken down to NUTS-3 level and extrapolated with the trademark growth rates (2012 to 2016) under the assumption that product and scientific innovation occurs at approximate pace. Trademark values on NUTS-3 level are obtained via the indicator European Union trade mark (EUTM) applications by NUTS 3 regions⁵.

The scale used in the mapping is a continuous scale; a deeper shading of the colour represents a higher value. The programme area is covered with a relatively wide range of values for the indicator. A minimum of 1.3 can be observed in Northern Flemish regions, with corresponding maximum of 102.4. Maxima are found along urban centres, for example NUTS-3 regions around London, Antwerp and the region of Holland.

Tourism and Sustainability

The synthetic indicator is composed of several sub-indicators which are individually picking up characteristics of the overall territorial dimensions in the framework innovative economic activities. The indicator is calculated in the following manner:

$$Sustainability = \frac{1}{3} * S_{i,t} + \frac{1}{3} * N_{i,t} + \frac{1}{3} * T_{i,t}$$

In which the variable $S_{i,t}$ represents a normalised approximation for seasonality of the individual region. Analogously, $N_{i,t}$ represents normalised area of NATURA 2000 habitats in a given region i and at time t . The variable $T_{i,t}$ represents the annual value of overnight stays in a given region i at time t . Thus, the indicator captures tourism, as well as its volatility and the general state of the environment. Each of the variables are normalised in the following manner, across the programme region and across ESPON Space. The individual values are scaled up by a factor of 100 to aid with the ease of interpretation.

$$S_{i,t} = (s_{i,t} - \min(s_{i,t})) / (\max(s_{i,t}) - \min(s_{i,t}))$$

As data sources, Eurostat and DG REGIO data is used. Seasonality is approximated via the use of a proxy variable. The variation of tourist arrivals over monthly intervals of a given year is calculated in in standard deviations. The indicator stems from Eurostat and is available in monthly intervals at national level⁶. For the size of NATURA 2000 sites, the indicator *NATURA 2000 area*⁷ is used. It measures the relative share of NATURA 2000 sites to the

⁴ tgs00041

⁵ ipr_ta_reg

⁶ tour_occ_nim

⁷ Source: EEA, DG REGIO

overall NUTS-3 region. Overnight stays are available as coverage ratios at hotels and similar businesses on NUTS-2 scale⁸. This indicator is broken down to NUTS-3 scale prior to use.

Human Capital in the Programme Area

The synthetic indicator is composed of several sub-indicators which are individually picking up characteristics of the overall territorial dimensions in the framework of knowledge-intensive economic activities and the necessary inputs. The indicator is calculated in the following manner:

$$HCAP_{i,t} = \frac{1}{3} * Y_{i,t} + \frac{1}{3} * E_{i,t} + \frac{1}{3} * P_{i,t}$$

In which the variable $L_{i,t}$ represents overall normalised employment in medium knowledge intensive industries (e.g. financial and real estate services) in region i and at time t , Analogously, $E_{i,t}$ represents normalised employment specifically in highly knowledge intensive industries (e.g. R&D) in a given region i and at time t . Each of the variables are normalised in the following manner, across the programme region and across ESPON Space. The individual values are scaled up by a factor of 100 to aid with the ease of interpretation.

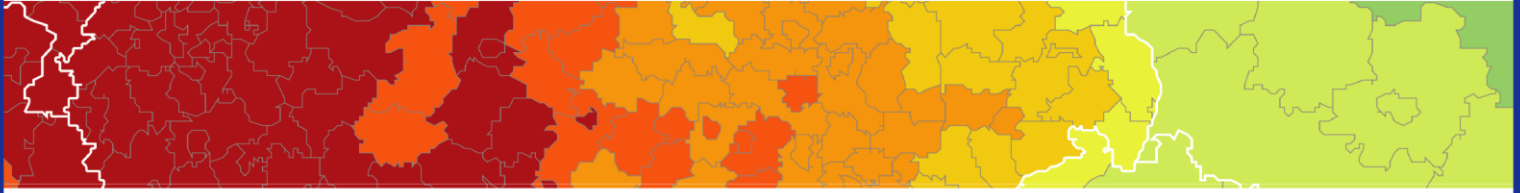
$$P_{i,t} = (p_{i,t} - \min(p_{i,t})) / (\max(p_{i,t}) - \min(p_{i,t}))$$

As data sources, Eurostat data is used. As EPO patent applications per NUTS-2⁹ were discontinued after 2012, data transformation methods were used to obtain more recent proxy values. The indicators were broken down to NUTS-3 level and extrapolated with the trademark growth rates (2012 to 2016) under the assumption that product and scientific innovation occurs at approximate pace. Data on employment in knowledge intensive sectors was obtained from the NACE dataset.¹⁰

⁸ tour_occ_anor2

⁹ tgs00041

¹⁰ nama_10r_3empers K_M & M_N



ESPON 2020 – More information

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