ESPON BSR-TeMo
Territorial Monitoring for the Baltic Sea Region

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1. Territorial cohesion and monitoring

1.1. Aim of TeMo, objectives and challenges

The Baltic Sea Region (BSR) is a highly heterogeneous area in economic, environmental and cultural terms, yet the countries concerned share many common resources and demonstrates considerable interdependence (CEC 2009). The BSR is characterised by a number of distinctive challenges and opportunities, many of which have their own specific territorial expression. This is the reason why monitoring of territorial development at different geographical scales in the region can help enhance growth and well-being.

TeMo stands for *Te*rritorial *Mo*nitoring. The main objective of the TeMo project is thus to develop an operational indicator-based territorial development monitoring system for the BSR including a qualitative policy interpretative dimension promoting territorial cohesion in the Baltic Sea Region. This should complement broader EU undertaking done by INTERCO project.

However, the TeMo system should not be regarded as a mere adjustment of the INTERCO indicators to the BSR specificity. The key TeMo feature is development of the system in close collaboration with its potential users – senior officers in the BSR countries responsible for territorial development. The BSR Committee on Spatial Planning and Development has assisted the project team in its conceptual and testing work. All this was done in order to ensure applicability of the TeMo system for support of the implementation of key BSR policy documents such as the European Union Strategy for the Baltic Sea Region (EU BSR-Strategy) and the VASAB Long Term Perspective (VASAB LTP) in the first instance. In addition however the EU 2020 Strategy, the Territorial Agenda 2020 (TA 2020) and other documents related to the EU Cohesion Policy have also been used as reference for development of the TeMo system.

Conceptualization of the territorial monitoring system of a high policy relevance and usability is not an easy task. First attempts took place in the BSR as early as in mid 1990s but with little success. Territorial development was considered as too complex to become subject to indicator based monitoring systems of a quantitative character. Instead, use of expert opinions and qualitative analysis was preferred at that time by the key decision makers. However, gradually hand in hand with increased understanding of importance of territorial aspects of growth and well-being also the need for more systematic attempts in measuring territorial dimension of those processes has become spelled out more frequently. The breakthrough was provided by official recognition of the notion of territorial cohesion at EU level and its upgrading to the status of one of the key objectives of the EU Cohesion Policy. This in turn allowed changing the nature of this policy from mere redistributive character to the full-fledged development policy based on the notion of different types of capitals: economic capital, human capital, social capital, institutional capital, natural capital and territorial capital. Similar changes in policy making patterns and understanding followed at national level. Thus territorial cohesion has been regarded as a core of the TeMo monitoring system.

1.2. Policy discourse on territorial cohesion

Although included in the Treaty of Lisbon (Article 3) and becoming one of the main important horizontal objectives of the EU policies, the territorial cohesion lacks a precise, commonly shared definition (Davoudi 2005; ESPON 2004, 118; Faludi 2005; Medeiros 2011, 11; Molle 2007, 98; Böhme 2011, 2; Farrugia, Gallina 2008, 7). However, although vague, the concept as such has been appreciated and widely recognised (Dühr *et al*. 2010, 188-189), and even considered as a potentially powerful conceptual innovation by the Commission (Camagni 2011, 79).

In EU member states the meaning of territorial cohesion varies slightly. It is considered as (Szlachta and Zaucha 2010):

- a means of enforcing territorial aspects in general, and in economy, social planning and decision-making in particular,
- a method of planning and development taking into consideration the territorial capital (potential) of places, settlements and regions, and their interrelations,
- an addition to economic and social cohesion, to include also the areas with geographic disadvantages (like mountain areas, islands, areas with severe climate, geographically remote areas or border areas).

The Territorial Agenda of the EU 2020 (2011) has reinforced the process dimension of territorial cohesion by stating that it is a "set of principles for harmonious, balanced, efficient, sustainable territorial development". The following principles have been mentioned in this context: equal opportunities for citizens and enterprises wherever they are located; convergence between the economies of better-off territories and those lagging behind; development best tailored to the specificities of an area; as well as continued networking, cooperation and integration between various regions of the EU at all relevant territorial levels. In the *Territorial State and Perspectives of the European Union* report (Damsgaard *et al*. 2011) cohesion is seen as a concept amalgamating diverse development paradigms such as convergence (polycentricity), sustainability, territorial competitiveness and regional vulnerability.

Also the INTERCO project came up with proposals of the main dimensions of territorial cohesion (Böhme 2011; Gløersen and Böhme 2011): strong local economies ensuring global competitiveness; innovative territories; fair access to services, markets and jobs; inclusion and quality of life; attractive regions of high ecological values and strong territorial capital; and integrated polycentric territorial development (ESPON 2011, part B, 11).

Summing up it seems that the concept of territorial cohesion tends to remain general, referring to territorial diversity and harmonious development of all places (which is perhaps the reason for its attraction and common acceptance). The analysis conducted above may, nevertheless, lead to some conclusions on its essence and evolution:

- Firstly, territorial cohesion has become a separate, independent goal of the EU on equal footing with economic and social cohesion, and in some models it is even treated as an umbrella concept embracing the latter.
- Secondly, territorial cohesion brings to the forefront the necessity of temporal trade-offs, due to domination of the long-term perspective in the territory-shaping processes.
- Thirdly, territorial cohesion pinpoints the need to take into consideration specificities of different types of territories in different types of human activities and interventions.
- Fourthly, territorial cohesion remains a heterogeneous concept covering different issues. Two of them, however, seem to be the most prominent: governance (the integration of policies affecting the same territory in order to improve policy efficiency) and territory

as a development asset (territorial capital, territorially bound social, institutional and natural resources).

- Fifthly, the concept of territorial cohesion carries with it important concerns about trade-offs between growth and other values shared by societies and expressed in the process of public choice (in a similar way as concepts of economic and social cohesion do).

In the VASAB documents the notion of territorial cohesion as described above plays a prominent role although its meaning has evolved in line with the changes in the spatial structure of Europe, its political and economic geography, the quality of life of European citizens, and the consciousness of an average citizen. For instance, in the initial VASAB document (VASAB 1994) territorial cohesion was regarded as a complement to economic and social cohesion. Nowadays it might be interpreted in the context of economy of flows (networking and co-operation), but its initial focus seemed to be on counteracting territorial disparities in growth and prosperity. However, the core concept of the document was in "territorial integration".

In the recent VASAB strategy (VASAB LTP) (VASAB 2009) this integration still remains an important development objective, while more attention is given to the notion of territorial cohesion (Zaucha and Fischer 2009, 624). In fact, the LTP is written as an illustration of how regional co-operation such as VASAB (ministerial network) can complement the EU Cohesion Policy with a territorial dimension and how it can enhance territorial cohesion at a larger geographical scale - both terrestrial and maritime.

The meaning of territorial cohesion has changed since 1994 though. It evolved towards being an umbrella concept that captures the contribution of territorial structures to development. The concept should not be mistaken for the convergence of the well-being or level of living in space, but it rather points towards accumulation and maintenance of the territorial capital and/or more integrative management patterns in space (i.e. the integration and territorialisation of policies).

Similar transformation of the understanding of the notion of the territorial cohesion can be observed in the debate powered by the documents prepared by the EU Commission, mainly the Cohesion Reports (CEC 2001; 2004b; 2007; 2010). This evolution can be summarised by the following observations:

- From a static concept of the state of a territory to a dynamic concept of policy integration in line with the specificity of the given territories,
- From the vehicle or instrument used to achieve social and economic cohesion to a genuine, independent EU objective,
- From a redistributive approach advocating spatial equalization of prosperity to the recognition of the importance of territorial factors in the process of development and satisfaction of human needs.

One should keep in mind that in the policy making system of the EU, territorial cohesion is mainly seen as a shared responsibility of the member states and the EU Commission.

At EU level, it guides mainly strategic documents[1]; whereas at national level the EU member states have recently conducted joint analysis on the application of a

[1] For instance in The Fifth Report on Economic, Social and Territorial CEC (2010) territorial dimension of key EU challenges (accelerating globalisation and market integration, ageing and migration, climate change, changing energy paradigm) has been brought to the attention of policy makers. In the 7th progress report on economic, social and territorial cohesion (CEC 2011) the contribution of regions

"place based" policy paradigm[2] in national and regional policies (Zaucha, Świątek 2013).

Territorial cohesion has been introduced to the programming of EU interventions financed from the Structural Funds. In the Commission Staff Working Document, Elements for a Common Strategic Framework 2014 to 2020 (CEC 2012), an emphasis was put also on integrated territorial development. The adjective "territorial" implies development which pays attention to specific features and endowments of different EU territories and regions. Therefore the Commission will want the Member States to make the programmes - launched under the Common Strategic Framework (CSF) i.e. the former Structural Funds - reflect the diversity of European regions "whether in terms of employment and labour market characteristics, commuting patterns, population ageing and demographic shifts, cultural, landscape and heritage features, climate change vulnerabilities and impacts, land use and resource constraints, institutional and governance arrangements, connectivity or accessibility, and linkages between rural and urban areas" (CEC 2012, 12). This statement might be considered as an indication of territorialisation of the EU programming process and abandoning a territorially blind approach based on the "one model fits all" principle. The Commission will also ask the Member States to apply an integrated approach that would link the Europe 2020 Strategy with regional and local actors when developing the partnership contracts.

The proposal of the Common Provision Regulation also identifies eleven thematic objectives. Unfortunately at present the objectives are spatially blind. Their final territorialisation will depend on the determination of the Member States to pursue the paradigm of territorial cohesion in policy implementation in practice. Thus at this stage it is extremely difficult to find out which type of territorial indicators will be necessary for the preparation of partnership contracts and operational programmes. One can only guess that they might include standard accessibility indicators to education and ICT; indicators dealing with transport and general accessibility; indicators related to territorially bound resources within - first of all - the domain of renewable energy; indicators on poverty, inclusion, human capital and social capital at a low (local) level of spatial resolution; indicators on functional labour markets, networking and economy of flows; on fragmentation and connectivity of biotopes, and - last but not least - on several spatial aspects related to exploitation of the maritime space. However, this is only a guess.

A new instrument introduced by the EU Commission in co-operation with the Member States to foster development in broader continuous areas is the macro-regional strategies. Adopted by the European Commission in June 2009 and endorsed by the European Council in October 2009 (CEC 2009), revised in 2012 the European Union Strategy for the Baltic Sea Region is pursuing three objectives: saving the sea, connecting the region, and increasing prosperity (Drafting on Ketels (2009). More details in Volume 1 of the Scientific Report). The key territorial processes and phenomena that would require monitoring will be the following:

- development of intelligent transport corridors at sea (in relation to safe shipping),

and cities to the Europe 2020 headline targets has been analysed while stressing the need of policy territorialisation due to the fact that they face very different combinations of development problems and growth potential.

[2] The proposed by Barca (2009) "place-based approach" should be seen as a vehicle for implementation of the territorial cohesion in practice.

- development of trans-boundary maritime spatial planning (in relation to better operation),
- changes in accessibility and connectivity and quality of TEN-T core and comprehensive network elements (in relation to good transport conditions),
- changes in prosperity and diminishing divides (e.g. GDP/per person, HDI index, employment rate, expenditures on R&D, labour productivity) - the problem is that these indicators should be measured at the level of sub regions (NUTS-2/3) instead of at the BSR level only to show the territorial EU 2020 pattern (in relation to prosperity),
- implementation of the VASAB LTP (in relation to the renewed horizontal action).

1.3. Baltic filter

In order to identify the main components of the BSR territorial monitoring system, the European territorial debate was translated to the Baltic Sea Region's specificity and priorities. The results are presented in the table below which features the specific components of the European territorial discourse that were given a prominent place in such VASAB strategic documents as:

- the strategy of 1994 (VASAB 1994),
- the key themes of 2001 (VASAB 2001),
- the key challenges of 2005 (VASAB 2005),
- the action agenda of 2009 (VASAB 2009).

Table 1 Correspondence between EU and BSR goals and priorities for territorial development

EU territorial goals, options and principles	**EU strategy for the BSR (amended 2012)**	**Main VASAB documents identifying priorities for spatial development of the BSR**			
Key components of European territorial debate (aims, goals, priorities)		**VASAB strategy of 1994**	**VASAB key themes of 2001**	**VASAB key challenges of 2005**	**VASAB action agenda of 2009**
Balanced territorial development encompassing different types of territories	++ (mainly via HA Spatial Planning)	++	++	++	++
Polycentricity of the settlement structure	+ (indirectly in relation to LTP)	+	++	++	++ (enhancement of SMESTO development)
Quality of urban nodes, dynamism and competitiveness of cities, sustainability of their structures, their integrated development	+ (indirectly in relation to LTP)	++	++	++	++
Networking and co-operation between cities, city regions	+ (indirectly in relation to LTP)	++	++	++	++
Functional areas including urban rural co-operation, integration of border areas, coastal zones	+ (indirectly in relation to LTP)	++ (urban, rural, border, coastal zone, islands)	++ (transnational development zones, rural areas, coastal zone, islands)	++ (transnational development zones, coastal areas)	++ (urban, rural)

Access to services of general interest	+ (some services of general interest like transport, education to some extent health)			+	
Territorial assets/territorial capital (e.g. cultural landscapes, natural and cultural heritage, trust etc.)	++ (mainly via HA Spatial Planning)	+ (mainly cultural landscapes)	+ (mainly cultural landscapes)	+ (sea space)	++ (sea space, local capacities for change)
Critical green mass, for instance: green networks, ecological corridors and preservation of areas of high ecological value	++ (in relation to sea mainly)	++	++		
Access to knowledge and diffusion of innovation	++				++
Regional clusters of competition and innovation	+ +			++	++
Transport Accessibility, Connectivity, Parity of Access to technical Infrastructure, development of TEN-T	++	++	++	++	++ (including ICT)
Intermodality of transport and greening of transport	++	++		++	++ (motorways of the sea)
Territorial governance, coordination of policies influencing the same territory	++ (in relation to sea mainly)	++		++ (territorial dimension of development policies)	
Diminishing territorial divides or alleviating their consequences[3]	++ (mainly via HA Spatial Planning)	+	+		+ (integration of Russia into BSR)
Developing energy resources	++	++			++ (incl. transmission grid)
Sustainability of tourism development	++				
Trans-European risk management including the impacts of climate change and preparedness to natural and man-made disasters	++				

Own elaboration

[3] The main divides that VASAB has always referred to are between more and less affluent countries (E-W divide), between countries with low and high population density (N-S divide), and between rural and urban areas (U-R divide).

The analysis reveals a rather stable picture of the BSR priorities for territorial development. It can be noticed that within the last 13 years only few new elements i.e. innovation and clusters (at the expense of nature protection) were added. One should also keep in mind that in the recent VASAB report of 2009 some demographic issues related to social cohesion and maritime spatial planning were considered as an important field of joint spatial actions. In fact, they were assigned a more prominent role than in the Territorial Agenda of EU 2020 where they were mentioned under challenges and as parts of implementation mechanisms respectively.

The aforesaid analysis might help identify the main components of the territorial development as presented below and embed them into a framework for the BSR territorial monitoring system. Some elements of the European territorial discourse, less frequently mentioned in the BSR documents, have been merged into the more popular ones. The least frequently quoted ones have been completely left out.

1) Balancing territorial development, diminishing territorial divides (such as the Urban-Rural, East-West, and North-South divide) or alleviating their consequences (paying attention among others to the integration of Russia into the BSR)

2) Maintaining at least the existing polycentricity level of the settlement structure and – consequently – ensuring access to services of general economic interest for the entire BSR population

3) Ensuring high quality of urban nodes (dynamic competitive and sustainable large and small cities), and their networking (cooperation of cities and city regions) with focus on diffusion of innovation and enhancement of knowledge-based development

4) Emergence and development of regional clusters of competition and innovation

5) Integrated development of functional areas with focus on: Urban-rural cooperation, coastal zones, islands, and integration of border areas

6) Development of territorial assets/territorial capital

7) Wise use of the sea space

8) Eco-resilience; for instance: green networks, ecological corridors and preservation of areas of high ecological value

9) Ensuring accessibility, connectivity and parity of access to transport and ICT infrastructure, and development of TEN-T.

10) Enhancement of inter-modality of transport and greening of transport, including motorways for the sea and short sea shipping

11) Development of renewable energy resources (also at sea) and the BSR transmission grid (integration of energy infrastructure in the BSR)

12) Territorially oriented governance (including vertical and horizontal integration of policies)

One can take the listed twelve points as the BSR specific operational interpretation of the concept of territorial cohesion. Therefore territorial cohesion by BSR circumstances can be defined as an overarching (macro) goal of different types of policies, prompting them to support an integrated territorial development of the BSR[4]. Such development requires integration of policies and their mutual (vertical and horizontal) coordination in relation to their impact on the BSR territory. The BSR specific objectives constituting territorial cohesion that have

[4] The concept of an integrated territorial development has recently been promoted intensively in the draft regulation on the EU Cohesion Policy but in a slightly narrower sense, mainly limited to the Community Led Local Development and Integrated Territorial Investments.

been listed and agreed upon in the strategic BSR documents include: diminishing territorial divides; enhancing polycentricity of development; contributing to sustainable city (urban regions) development and their networking and co-operation; facilitating formation of functional regions in particular those related to innovations and the knowledge-based economy but also those with specific territorial endowments; promoting wise use of territorial assets (immovable assets or territorial capital); enhancing accessibility and connectivity and parity of access to transport and ICT infrastructure; diminishing pressure on the natural and cultural environment; and finally opening of the space of the Baltic sea for sustainable development. In brief, the desired process resulting from the application of the notion of territorial cohesion is policy integration and territorialisation (making them place-based or territory sensitive) whereas the desired state of territory is depicted by the aforesaid objectives or priorities agreed upon by the BSR countries.

The monitoring system should try to measure both aspects of territorial cohesion, while being aware that measuring the territorial cohesion process can be extremely difficult and complex. Moreover, any monitoring system – if tailored to the BSR needs – should also provide spatial planners with clear measurement of the BSR divides as an important contextual factor conditioning the BSR policies and efforts. The system should also take advantage of and serve the monitoring purposes of the EU Strategy for the BSR.

1.4. Ensuring continued relevance

The provided above analysis reveal a stable temporal pattern of the BSR territorial development policy. However, the focus and attention given to different policy goals and tasks might vary with time. In the 1990s' top attention was given to connectivity, transport infrastructure and function of cities, whereas nowadays economy of flows is given a more prominent role - meaning increased importance of networking, cluster formation in support of knowledge based economy.

Therefore, the territorial monitoring system should be flexible enough to be able to respond to new policy challenges and directions and at the same time very stable to allow temporal comparison and reveal long-term trends and in particular warn about changes in them.

All these can be achieved by a combination of meaningful statistical information (data/variables) with relevant territorial typologies. Statistical information should be of more or less routine nature collected in all territorial units of the BSR over the longer period of time. The key challenge is to turn it into meaningful policy indicators responsive to the current policy needs and appealing to the minds of policy makers. For that, aforesaid territorial typologies are necessary as well as background theories depicting the role of territorial assets in key societal processes. Thus the system should allow for construction of different indicators, in line with key policy needs, based on the limited set of routinely collected statistical information (variables). This is condition sine-qua none of the success of any territorial monitoring system. However, one should keep in mind that the key role of any territorial monitoring system (its nature) is not to provide easy answers to the policy problems but rather to stimulate discussions and provide relevant evidence to be used together with other (more qualitative) inputs in the decision making processes. This pinpoints the importance of the context type of information.

Framing and construction of the territorial monitoring system (presented in the subsequent chapter) is only a first step in providing the right policy support. Relevance of the system would depend on many factors. The most important of them are listed below.

a) understanding among policy makers of the role and opportunities provided by the monitoring system and their ability to use them,

b) permanent and timely updating of the statistical information forming core of the monitoring system, coupled with straggling changes of the borders of territorial units for which statistical information is collected,

c) constant critical examination of the ability of the system to meet the needs of the policy making resulting in construction of new indicators and abandonment of the outdated ones,

d) encouragement of the usage of the system for providing more complex spatial and temporal analysis in order to ensure integrative territorial approach and avoiding "silos" type of thinking in policy making.

The TPG of TeMo has addressed all these challenges during the project. First, by producing a user-friendly system for the future users of the system, i.e. elaborating the *Presentation Tool* and a number of dissemination publications; second, the challenge of deciding on the limited set of core variables to be collected at BSR level divided into domains and subdomains; third the challenge of proposing concrete indicators (including complex indicators); and fourth, the challenge of examining their relevance under four thematic assessments.

However, all these indicate that running of the system would require specific skills and knowledge. It must be done in a pro-active way in day to day collaboration with the research sector (academia), policy makers and private business. The minimum requirements on that are spelled out in the latter part of this report. However, here, one should underline that without such approach the system relevance would fade as time passes. Thus the ownership of the system - in mental, not legal terms - is a precondition of its usability in the future.

1.5. Position of a monitoring system in the public policy cycle

Monitoring is a continuous process of gathering and interpreting information aimed at maintaining up-to-date data in order to allow relevant stakeholders to track progress against stated objectives (OECD, 2011). In this particular case, monitoring aims at feeding relevant information into a policy process and providing territorial evidence and analysis to the policy makers, responsible for cohesion policy at different levels of government; as illustrated in figure 1.

Generally, two different kinds of monitoring might be distinguished: implementation-focused monitoring and results-based monitoring. Implementation-focused monitoring assesses how well an intervention is being executed, often linking it to a particular unit of responsibility. This sort of monitoring mostly focuses on the process, not providing an understanding of the success or failure of the intervention. Results-based monitoring, on the other hand, involves a comparison, since actual performance is compared with the expected results of the intervention (World Bank, 2004). In the former case, a situation is being monitored, measuring change or lack of change in condition, observing wider context or trends. In the latter case, performance is being monitored, measuring progress in achieving specific objectives and results in relation to implementation plan. The latter type of monitoring is in question in TeMo.

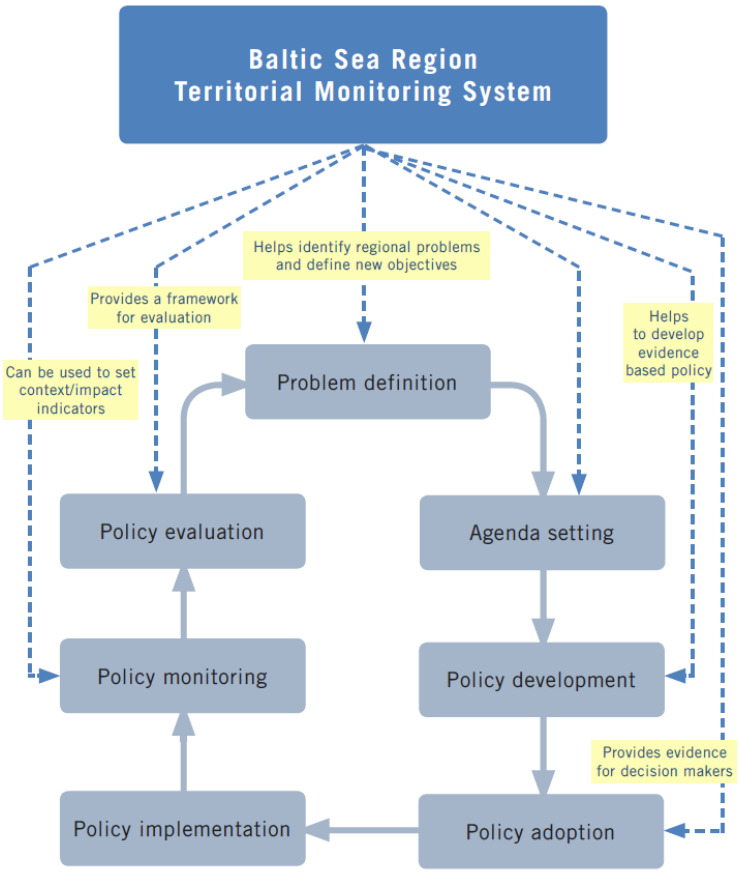


Figure 1 Monitoring in the policy cycle.

In the public policy cycle monitoring is closely interlinked with evaluation. Both of them are concerned with the collection, analysis and use of information to support informed decision-making. Monitoring, as well as evaluation, looks at the relevance, efficiency, effectiveness, impact and sustainability of interventions (EC, 2008). Monitoring usually forms the basis for evaluation, since its findings may be used as part of evaluation. Nevertheless, a couple of key differences between these two concepts should be emphasized.

Firstly, one of the main differences between monitoring and evaluation lies in the ability to address issues of causality. Even though monitoring provides information on intervention activities and results (collects data on indicators, compares actual results with targets, reports progress alerting to problems), it is rather descriptive and may not be able to explain success or lack of success of a particular outcome and causes of a particular problem. It typically focuses on inputs, activities, outputs and shorter-term outcomes, presenting what has been delivered. Evaluation, in turn, mostly concerns outcomes and overall goal of the intervention, aiming at answering the question 'what has happened as a result of the intervention? Secondly, another key difference between monitoring and evaluation is related to the timing. Monitoring is a continuous process, ongoing throughout the intervention. It checks the progress and is concentrated towards improving quality of implementation and adjusts planning. Evaluation, on the other hand, is conducted at specific point in time. It assesses the progress and

aims at identifying the impact of the intervention, adjusting objectives and determining the future of the intervention.

Monitoring, in tandem with evaluation, has three key purposes. It usually serves as a threefold tool: (1) management tool, (2) accountability tool, and (3) learning tool.

(1) Management tool: monitoring provides critical information on progress, problems, and performance, necessary for empowering decision-makers to make better-informed decisions (World Bank, 2004). It highlights the strengths and weaknesses in the implementation of the intervention. Thus, it functions as an 'early warning system', allowing for timely and appropriate changes to the current intervention plan (EC, 2008). By providing evidence to the decision-makers, monitoring influences decisions regarding the future of the particular intervention. ESPON BSR-TeMo provides relevant indicators for the entire BSR area necessary for measuring progress and achievement of objectives of territorial cohesion policy. Information supplied by BSR-TeMo offers decision-makers an opportunity to carry out dynamic analysis of indicators and, thus, provides framework for policy evaluation. BSR-TeMo sets the background for identification of territorial development opportunities and challenges at regional level, as well as patterns of economic and social developments. Monitoring data assists decision makers in defining new objectives, specifying priorities in the area of potential intervention within the framework of cohesion policy and generally helps to develop evidence-based policy.

(2) Accountability tool: by providing information, in a structured and formalised manner, monitoring allows scrutiny of the intervention (PSC, 2008). By clarifying the status of actions related to the intervention monitoring aims at holding intervention accountable for the use of resources to internal and external stakeholders (World Bank, 2004). Publicizing findings of monitoring to the broader audience helps promote transparency. Thus, monitoring allows legitimizing the purpose of the intervention by demonstrating whether interventions have the desired effect. The TeMo system achieves this – it provides a basis for a place-based dialogue between different tiers of government and other development stakeholders on the development of territorial cohesion.

(3) Learning tool: monitoring might be a source of knowledge capital, since it enables decision-makers to explore which kind of interventions is most successful and why. In this way, it enhances organizational learning. Monitoring provide a continuous feedback in the management process and substantial evidence as the basis for any necessary mid-course corrections in the interventions. Systematic collection and analysis of information on the implementation of the intervention provides decision-makers with better means for learning from past experience, creates the basis for reassessing priorities, informs decision making and potentially improves performance. (World Bank, 2004)

2. The Territorial Monitoring System

2.1. Overall framework

A territorial monitoring system consists of numerous elements. First and foremost the indicators and the data for these but to view it in its totality, it is important to emphasise that analysis and methodological considerations when analysing the development and comparing the indicators across the territory are equally important elements of a well-functioning and relevant territorial monitoring system.

The complex extents of the TeMo territorial monitoring system can be illustrated as in Figure 2 below. While the TeMo documents, including the ESPON deliveries, the dissemination publications, and the TeMo *Presentation Tool* are the tangible outputs of the TeMo project, the full set of elements to the left comprises the full content of the territorial monitoring system.

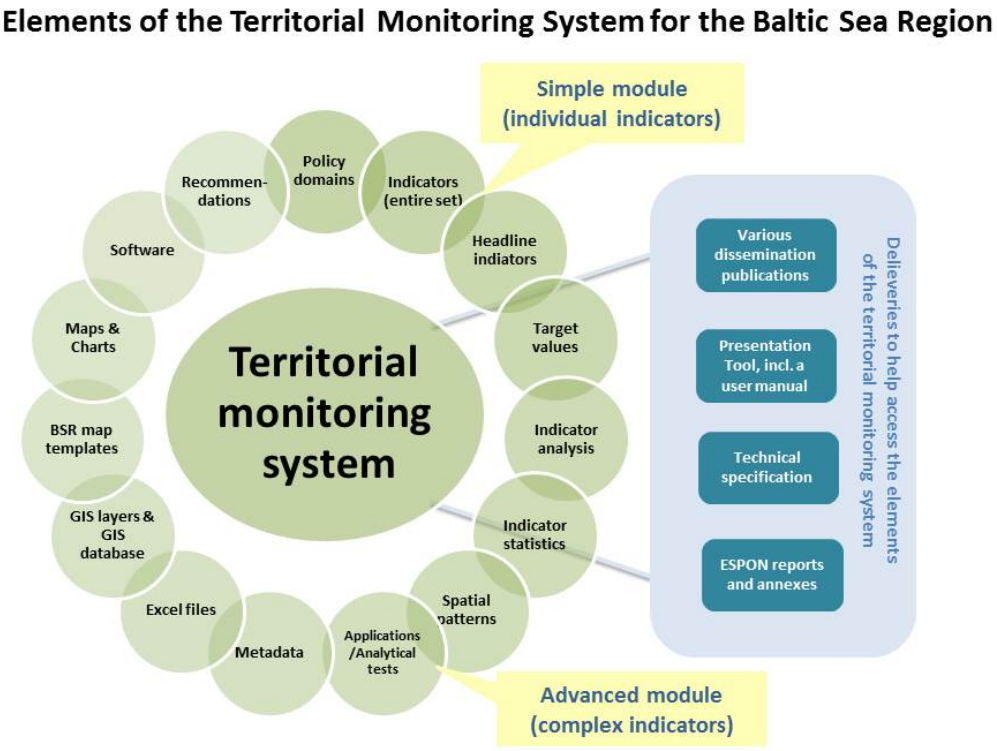


Figure 2 Complex structure of the territorial monitoring system

2.1.1. Simple and advanced module

It was outlined in the Terms of Reference for the TeMo project that the project implementation should envisage a "two level" monitoring system: a basic monitoring module containing simple indicators, showing basic and easily-explainable/-understandable development trends, and a more advanced module containing more sophisticated and complex/combined indicators. Another aspect of the division into a basic and advanced module was that this division could also provide a resource prioritization for the future updates of the monitoring system,

in that it was envisaged that the data for the simple indicators would be easier to obtain and require less calculations and explanations. However during the project process it became clear that the desired intentions behind this suggestion could not be adequately honored in the outlined two-level structure.

What has emerged from the conceptual and policy oriented work package is a need for a comprehensive and integrated understanding of the process of territorial cohesion, and thus, such a division of indicators would be rather detrimental. Apparent simple indicators can contain very complex information and also need high level of analytical skills to explain their impact on territorial cohesion. Thus it is better for dissemination, presentation, analysis, testing and construction of the visual TeMo *Presentation Tool* to keep the system together and follow another approach. Therefore, rather than dividing the indicators onto two module 'levels', we have developed a simple module containing thematically organized indicators – based on the policy domains identified in work package 1 - and an advanced module containing 10 separate complex indicators that can be used to cross-sectoral and cross-indicator monitoring of the major aspects of territorial cohesion in the BSR, see figure 3. Those indicators directly address top policy issues such as spatial distribution of development, spatial convergence and key BSR divides.

On top of that, we propose to prioritise some indicators within the simple module in terms of frequency for their updating. This is important in order to ensure that the monitoring system will allow for identification of key changes in territorial cohesion in relatively short time after their occurrence. These indicators are named *headline indicators* and are NOT to be confused with the complex indicators of the advanced module of the system. The headline indicators are selected on the basis of conceptual and scientific criteria and will be explained in detail in Chapter 2.2.2. The headline indicators thus function as a short list of indicators for each policy domain, but it is important to point out that one indicator is not sufficient to cover a whole policy domain, nor is it sufficient to identify development trends for territorial cohesion in the BSR.

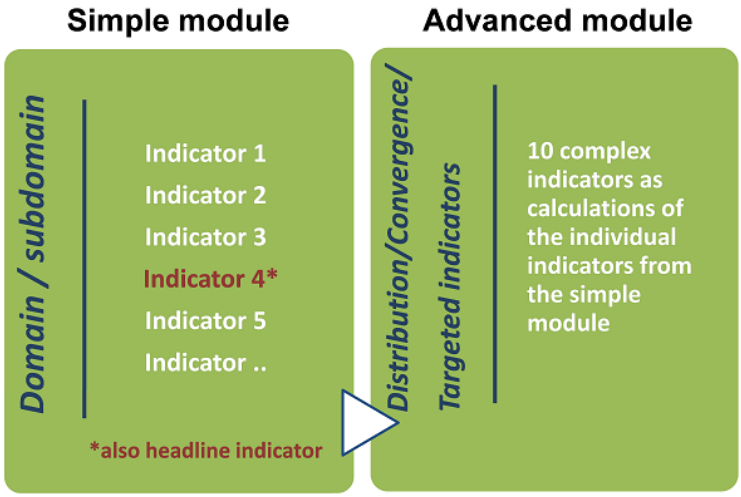


Figure 3 Schematic representation of the simple and advanced module

Summing up, it can be argued that the main part of the monitoring system – the simple module – is the compilation and analysis of the chosen indicators, while the advanced module address standardized cross-indicator analysis options by relating different indicators with each other, and by producing advanced indicators through statistical procedures (such as GINI coefficients etc.) in order to address key policy challenges related to territorial cohesion.

2.2. Domains, subdomains, indicators and headline indicators

2.2.1. Domains, subdomains and indicators

Based on 1) the project specifications and analysis of policy and development in the BSR, 2) the ideas and comments put forth by the Steering Committee, 3) renewed input from ESPON on indicators, 4) a meeting with Russian data experts in Saint Petersburg, and 5) the internal expertise of the TPG, we have developed a final set of 5 domains, 12 subdomains and 29 indicators which constitute the simple module of the BSR-TeMo, see Table 2.

Table 2 Overview over domains, subdomains and indicators

Domains	1. Economic performance and competitiveness
Baltic raster / Normative aspect of domain	Place-based economic development. Development of territorial assets/territorial capital. Context indicators.
SUBDOMAINS AND INDICATORS	**Macroeconomic development**
	GDP per capita
	GDP per person employed
	Labour market
	Unemployment rate, total
	Employment rate (20-64 years)
	Demography
	Net migration rate
	Total population change
	Economic dependency ratio

Domains	2. Access to services, markets and jobs
Baltic raster / Normative aspect of domain	Balancing territorial development, diminishing territorial divides or alleviating their consequences. Maintaining at least the existing polycentricity level of the settlement structure. Ensuring accessibility, connectivity and parity of access to transport and ICT infrastructure, development of TEN-T.
SUBDOMAINS AND INDICATORS	**Potential accessibility**
	Accessibility potential by road
	Accessibility potential by rail
	Accessibility potential by air
	Multimodal accessibility potential
	Spatial structure
	Functional areas: access to cities
	Population potential within 50 km
	Border crossings
	Internet
	Households with internet access at home

Domains	3. Innovative territories
Baltic raster / Normative aspect of domain	Ensuring high quality of urban nodes, and their networking with focus on diffusion of innovation and enhancement of knowledge-based development. Emergence and development of regional clusters of competition and innovation.
SUBDOMAINS AND INDICATORS	**Human capital**
	Population with tertiary education (25-64 years)
	Employment in technology & knowledge sectors
	Financing and institutions
	Gross-domestic expenditures on R&D, business
	Gross-domestic expenditures on R&D, total

Domains	4. Social inclusion and quality of life
Baltic raster / Normative aspect of domain	Brought forward at the stakeholder workshop in Potsdam, as result of present economic, financial and social crisis in Europe
SUBDOMAINS AND INDICATORS	**Social inclusion**
	At-risk-of-poverty rate
	Severe material deprivation rate
	Youth unemployment rate (15-24 years)
	Gender imbalances
	Health
	Life expectancy at birth, in years
	Self-assessed general health status

Domains	5. Environmental qualities
Baltic raster / Normative aspect of domain	networks, ecological corridors and preservation of areas of high ecological value. Development of renewable energy resources (also on the sea) and the BSR transmission grid.
SUBDOMAINS AND INDICATORS	**Consumption and production**
	New soil sealing per capita
	Air pollution (PM10)
	Eutrophication
	Natural resources
	Fragmentation index

Through the work on selecting the most policy relevant domains, it was clear that some other domains should also be covered by the monitoring system since they are important for territorial cohesion, e.g. a domain on governance was considered as very desirable. However, this has to remain as a 'wish domain' due to lack of appropriate (quantitative) indicators. For instance, as it has also been concluded in the ESPON TANGO project, governance is path-dependent and very sensitive to context wherefore it is difficult to create good general indicators of such a domain. This perspective on the lack of one-directional indicators for monitoring the policy domain of governance was also supported by e.g. stakeholders from Russia. Thus, the TPG chose not to include the domain at all rather than maintain a domain with low quality indicators. This opinion was also supported by the stakeholders. When good indicators for governance are developed the territorial monitoring system can of course be expanded to also include this domain.

A starting point for the selection of indicators was that it should ideally be possible to cover them by available data on regional level, or data that was possible to produce in order to include in the TeMo project. Ideally, the selected indicators should also be covered by comparable data from all regions of the BSR, here with special attention to Russian and Belarus data, and there should ideally be data available from several years, in order to provide for time series.

On the other hand, the relation of each tentatively selected indicator was examined against the BSR policy goals and challenges (cf. BSR specific definition of territorial cohesion provided in subchapter 1.3). The results of those investigations are presented in Table 3 in Volume 2 of the Scientific Report. As the result of this, only policy relevant indicators were selected.

2.2.2. Headline indicators

The principal task of a monitoring system is its ability to provide direct policy advice. Simplicity and sensitivity to rapid changes are key features that should be strived for. If a monitoring system consists of a large number of specific indicators, then a frequent updating of these consumes considerable time and resources. Due to resource efficiency, a limited number of variables are usually chosen to be collected more frequently than the remaining large mass of indicators in a monitoring system.

Such indicator short lists or headline indicator systems are the norm rather than the exception in most comprehensive and frequently updated policy strategies, the EU 2020 strategy, the EU Sustainable Development strategy, the Lisbon/Gothenburg strategy, OECD Green Growth strategy, and a large number of UN monitoring systems, to mention but a few.

If properly chosen, the limited set of indicators can generate warning signals much faster than the complex set of information and at the same time point out the need for more comprehensive analysis to be undertaken. In an ideal case, this limited group of indicators is not only more resource efficient (i.e. easy/economic/etc.) to collect, but they are also able to provide a general picture of what the entire monitoring system is measuring. They may be missing out on some particular details or aspects, but by and large they are able to efficiently communicate the principal trends.

We feel that this would be sensible also in the context of the BSR-TeMo, and hence we have introduced *suggestions* for one or a few headline indicators for each domain. We wish to stress, that this suggestion for these headline indicators is not in any way connected to the question of the so called "complex indicators", which is a totally different issue and discussed in detail in Chapter 2.1.2.

An effective headline indicator should be:

a. conceptually representative for a larger group of indicators;
b. frequently updated by the provider;
c. of limited time lag with regard to data used for its construction;
d. easily available for different types of territorial units; and
e. of direct policy relevance.

The identification of these indicators is based on a comparative analysis, where aspects such as the conceptual coverage of the entire domain, the policy relevance of the indicator, data availability for entire BSR, time series availability and update frequency, data time lag, the territorial level used, availability within the European Statistical System, as well as the assessed effort for possible data modification required, are considered.

In addition to these criteria, we have also conducted a Principal Component Analysis of the available data in each domain. This analysis in practice provides us with a statistical ranking of each indicator per domain in the sense of how much each individual indictor is able to explain the variation in all other individual indicators in that domain. In other words, it provides a statistical assessment of which is the "leading" or most "overarching" indicator per each domain.[5]

Table 3 below presents the assessment criteria used in justifying our suggestions for a headline indicator per domain.

[5] In the domain "Innovative territories", the number of variables examined is small and the PCA results should be considered indicative only.

Table 3 Assessment criteria for identification of headline indicator(s) for each domain

Domain	Suggested headline indicator	Assessment criteria									
		Conceptual coverage of entire domain	Policy relevance of indicator	PCA (Principal Component Analysis) results for domain	Full data availa-bility for entire BSR	Time series availabili ty	Data update freq-uency	Data time lag	Territorial level	Available within the European Statistical System	Require-ment for data modifi-cation
1. Economic performance and competitiveness	GDP/capita in PPS	Very high. Covers conceptually most aspects of economic performance.	Very high. Primary SF eligibility indicator, EU2020 and SD-strategy headline indicator	Highest ranking	Yes	Yes	Annual	2-3 years	NUTS-3 (sNUTS-2 for BY & RU)	Yes (except BY & RU)	None (except for inclusion of BY & RU)
2. Access to services, markets and jobs	Multimodal accessibility potential	Very high. Covers conceptually most aspects of physical accessibility	High. Included freq. in Cohesion reports and is part of official territorial typologies	Highest ranking (functional areas and border crossings excluded from the PCA)	Yes (in principle)	Yes (but limited	Infre-quent, currently ca. 5 years	1-2 years	NUTS-3 (sNUTS-2 for BY & RU, but in theory could be sNUTS-3)	No	Requires high external input. Only few institutions in the EU have capacity to perform
3. Innovative territories	Gross expenditure on R&D	Fairly high, but innovation not always the result of high R&D input, and high R&D input not always resulting in concrete capitalisation.	Very high. Headline indicator for EU2020 strategy	Second highest ranking. (Tertiary education attainment highest, but gap very small). (Indicative result only)	No. (BY, NO & RU missing, NO could be esti-mated from existing data)	Yes	Annual	2-3 years (tied to national accounts/ GDP)	NUTS-2	Yes	None (apart from possible inclusion of NO, BY and RU)

Domain	Suggested headline indicator	Assessment criteria									
		Conceptual coverage of entire domain	Policy relevance of indicator	PCA (Principal Component Analysis) results for domain	Full data availa-bility for entire BSR	Time series availabili ty	Data update freq-uency	Data time lag	Territorial level	Available within the European Statistical System	Require-ment for data modifi-cation
4. Social inclusion and quality of life	At-risk-of-poverty rate	Very high in terms of social inclusion, lower (and more indirect) in terms of QoL	Very high. Headline indicator for EU2020 strategy	Ranking only 4/5. The gap to nr 1 "Subjective health" however fairly small	No (BY and RU missing, but could in theory be esti-mated)	Yes	Annual	1-2 years	NUTS-2	Yes	None (apart from possible inclusion of BY & RU)
5. Environ-mental qualities	Soil sealing *and/or* Eutrophication	Moderate	High for both. Eutrophicatio n 1/4 thematic segments of HELCOM Baltic Sea Action Plan, soil sealing freq. in land use policy discourse e.g. due to link to urban sprawl	None performed (not possible for technical reasons)	Eutrophicati on: yes (Soil sealing; BY, NO & RU missing, could be estim. from land use data)	Eutrophi cation: yes Soil sealing: no	Eutrophic ation: frequent Soil sealing; Infre-quent, currently ca. 10 years	2-3 years	For soil sealing: NUTS-3 For Eutrophicati on: Baltic Sea subregions	No	Both require high external input (HELCOM & EEA)

In addition to these seven headline indicators, we also propose to utilise any or all of the proposed "Ten indicators for measuring territorial cohesion in the BSR" (chapter 2.1.3) as macro level headline indicators for the entire BSR. The application of any or all of these on primarily GDP would most likely be the most feasible approach, since GDP would in any way be collected and no additional effort would thus be needed for this more frequent data collection.

2.2.3. Advanced module: Ten Indicators for Measuring BSR Territorial Cohesion

We here bring forth a proposition for **ten separate complex indicators** that cover all major aspects of territorial cohesion in the BSR, i.e. 1) distribution, 2) convergence, and 3) specifically targeted BSR territorial cohesion objectives.

The chosen indicators have a clear territorial character since they each in their different form are able to highlight the interplay and performance of the regions of the BSR and they make extensive use of the ESPON territorial typologies. Each indicator (with the exception of the urban/rural ratio) is also fully inclusive in the sense that they take into account all regions of the BSR.

These indicators are nothing new in a technical sense; on the contrary, all are based on well-established and long–proven methods. We have merely consistently streamlined these indicators in a coherent manner for addressing, in all their forms, the specific territorial cohesion objectives of the BSR.

In comparison to any single indicator, the first strength of this palette is that it allows for a comprehensive measurement including multiple corroboration opportunities in order to safeguard a sound interpretation of the trends observed.

The second strength of this set of indicators is that they can be applied on any variable in the monitoring system, provided that it meets certain below listed simple criteria. The collection of indicators is therefore highly flexible.

You will find concrete examples of how these ten indicators have been applied comprehensively in Volume 4 of the TeMo Scientific Report (Case study on Territorial Cohesion) as well as more condensed indications of their usage in chapter 2.3 of this report.

Following is a short description of each of the proposed ten indicators together with the rationale and objective for utilising them.

Distribution indicators (1-3)

The three first indicators measure overall cohesion in a distributive manner, each from its own specific point of view.

(1.) The Gini Concentration Ratio (GCR) is one of the most widely utilised inequality indicators. It measures the dispersion of a phenomenon and it operates within the range 0-1, where a value of 0 would indicate perfect equality (i.e. in our case that all regions would be exactly the same) and a value of 1 in turn maximum inequality (i.e. that all that is measured would be concentrated into a single region alone). A GCR value of e.g. 0.45 could be interpreted as the amount (45 %) required to be shifted for perfect equality to take place. Apart from being non-spatial, the GCR has the analytic limitation that it reacts in relative terms equally on changes within the middle band of regions as it

does to changes in the extremes, which is troublesome, for it is most often occurrences at the extreme ends of the scale that are of interest to policy.

(2.) The Atkinson index seeks to address this shortcoming of the GCR by introducing a sensitivity parameter (ε value) that enables giving greater emphasis to, in our case, small or low performing regions. It operates on a similar scale as the GCR, i.e. 0 would indicate perfect equality and a 1 maximum inequality. When applied in the testing phase (see TeMo Scientific Report, Volume 4) the sensitivity parameter is set at 0.8, which implies that greater weight is given to changes among the lower performers. By comparing the results of the Atkinson index to those of the GCR, we are able to draw conclusions as to whether the changes in inequality stem from the changes in the lowest performers or not.

(3.) The 80/20 ratio (also known as the Kuznets ratio) is a simple bivariate analytic technique that concerns the relationship between the highest (top 20 %) and the lowest (bottom 20 %) performers. It is calculated as the ratio between these two and does as such not concern itself at all with what happens in the three middlemost quintiles. The higher the value, the larger is the discrepancy between the two extreme groups, and vice versa. A value of e.g. 8.0 indicates that the best performing group (i.e. the top quintile or the highest 20 % of regions) has eight times more of what is measured than the corresponding lowest performing group.

Convergence indicators (4-5)

The following two indicators measure the *process* of convergence by means of two commonly used standard techniques. By applying both methods in parallel, one can obtain a picture whether the process of convergence – or lack thereof – is of a *sigma type* (i.e. reduction of disparities in general) or of a *beta type* (i.e. convergence through a catch up of the low performers).

(4.) Sigma-convergence occurs when disparities in general are reduced. It is commonly measured simply by the *coefficient of variation*, which is calculated as standard deviation divided by the mean of all regions. The higher the value, the larger are the overall differences between all regions, and vice versa. This indicator is very sensitive to extreme outliers and can be used as a supplement to e.g. the GCR. A catch-up process of the poorest performers affects the value as much as would similar reductions among the best performers.

(5.) Beta-convergence concerns itself primarily with disparity reduction via a catch-up process by the poorest performers. It is measured by means of a linear regression model where the dependent variable is the level of the region at beginning of a period and the independent variable the change that has occurred during this particular period. By looking at the unstandardised "b" regression coefficient from each model, one can obtain a picture of how much the growth rate is affected by the initial level. A negative rate implies increasing convergence, as it de facto (on average) implies that the lower a region's performance is, the higher has been its growth rate. A positive value indicates the opposite, i.e. a pull-off by the best performers.

Targeted BSR territorial cohesion indicators (6-10)

The remaining five indicators are targeting five specific aspects of territorial cohesion with particular relevance in a BSR context. Simple though they are from a methodical point of view, they nonetheless are able to provide a more diversified picture of different aspects of territorial cohesion in the BSR with a clear focus on regional specificities, and

may be used in addition to the more mathematical indicators described above. One aim of these is to capture the three principal divides of the BSR. Each indicator is bivariate meaning that it compares two groups of regions against each other. The last four of these indicators are based on four different DG Regio territorial typologies (supplemented by information on Belarus and NW Russia) and as such can only be applied on data available at NUTS-3. Each indicator is calculated as a straightforward ratio, and for example a value of 1.3 would indicate that the numerator (e.g. "east" in the "east/west ratio" or "south" in the "south/north ratio") has 30 % more of the measured entity than has the corresponding denominator.

(6.) The east/west ratio compares the amount of a phenomenon in eastern BSR to that in western ditto. Eastern BSR is comprised of the new German Länder, the Baltic States, Poland, Belarus and NW Russia. The Nordic countries and former West Germany including the NUTS-3 region of Berlin are in turn classified as Western BSR.

(7.) The south/north ratio is based on the DG Regio typology of sparsely populated areas (supplemented by information on NW Russia and Belarus). All regions classified as sparse in the typology (i.e. less than 12.5 inhabitants/km² at NUTS-3 level or less than 8 inhabitants/km² at sNUTS-2 in NW Russia and Belarus) are classified as "north", the remaining areas as "south".

(8.) The urban/rural ratio is based on the DG Regio Typology on urban-rural regions supplemented by information on NW Russia and Belarus. The indicator compares the class "predominantly urban regions" with the class "predominantly rural regions". The latter class includes both regions "close to a city" as well as "remote" regions. This indicator hence excludes the middlemost category of the typology ("Intermediate regions") and is able to provide a crude picture on relative changes between the top and bottom section of the urban-rural hierarchy.

(9.) The non-border/border ratio is based on the DG Regio typology "Border regions - internal and external" supplemented by information on Belarus and NW Russia. It compares the external border regions of the BSR to all remaining regions. Based on this typology, there are no external border regions identified in Denmark and BSR Germany.

(10.) The coast/inland ratio is based on the DG Regio "Typology on coastal regions", where coastal regions are classified on basis of the (low, medium, high or very high) share of population living within the coastal zone. Our indicator compares the entire group of coastal NUTS-3 regions to all other regions.

2.2.4. Data

The availability for data used within the BSR-TeMo project is shown in tables 4 and 5 below. Table 4 first of all shows the availability of data (for the indicators) for each BSR country. This table shows the possibility to collect data for one recent year and to produce an analytical map including this region in the BSR analysis. It does not show the occurrence of time series. The frequency table (5) shows this latter aspect, but due to the large about of information in such a table we have to show this for the EU BSR, Russian BRS and Belarusian regions aggregated. This means that if there are some regions within these aggregated with poorer data this gives the note that data is only partially available. Furthermore in table 5 for the indicators for which data are only available for specific years (like accessibility) there are lots of red cells of data not available.

Table 4 Coverage of TeMo indicators by BSR country (based upon latest available year)

Indicator	BY	DE	DK	EE	FI	LT	LV	NO	PL	RU	SE
GDP per capita	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GDP per person employed	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unemployment rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Employment rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Net migration rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total population change	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Economic dependency ratio	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Accessibility potential by road	X	✓	✓	✓	✓	✓	✓	✓	✓	X	✓
Accessibility potential by rail	X	✓	✓	✓	✓	✓	✓	✓	✓	X	✓
Accessibility potential by air	X	✓	✓	✓	✓	✓	✓	✓	✓	X	✓
Multimodal accessibility potential	X	✓	✓	✓	✓	✓	✓	✓	✓	X	✓
Functional areas: access to cities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Population potential within 50 km	X	✓	✓	✓	✓	✓	✓	✓	✓	X	✓
Border crossings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Households with internet access at home	X	X	✓	✓	(✓)	✓	✓	✓	X	✓	✓
Population with tertiary education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Employment in technology & knowledge sectors	X	✓	✓	✓	✓	✓	✓	✓	X	X	X
Gross-domestic expenditures in R&D, business	X	✓	✓	✓	✓	✓	✓	X	✓	X	✓
Gross-domestic expenditures in R&D, total	X	✓	✓	✓	✓	✓	✓	X	✓	✓	✓
At-risk-of-poverty rate	X	✓	✓	✓	✓	✓	✓	✓	✓	X	✓
Severe material deprivation rate	X	X	✓	✓	✓	✓	✓	✓	✓	X	✓
Youth unemployment rate	X	✓	✓	✓	✓	✓	✓	✓	✓	(✓)	✓
Gender imbalances	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Life expectancy at birth	✓	(✓)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Self-assessed health status	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
New soil sealing per capita	X	✓	✓	✓	✓	✓	✓	X	✓	X	✓
Air pollution (PM10)	X	✓	✓	✓	✓	✓	✓	X	✓	X	✓
Eutrophication	*Not applicable*										
Fragmentation index	X	✓	✓	✓	✓	✓	✓	✓	✓	X	✓
Number of indicators covered (Total number of indicators=29)	***13***	***27***	***29***	***29***	***29***	***29***	***29***	***25***	***27***	17	***28***

Note: Assessment based upon latest available year, i.e. reflecting the standard BSR maps as presented in the Presentation Tool.

Regarding the data used for the indicators within the project, five basic principles have been adhered to. One such basic principle has been that data needed for the project has been collected in the form of variables rather than indicators. E.g. the TeMo indicators are most often based on several variables (i.e. GDP, population data) that were later combined (calculated) in order to build the indicator (i.e. GDP/capita).

A second principle has been the time frame of collected data (time series). Before collection started during the winter 2012-2013, the time frame was set to start in 2005, up to latest data available (in some cases data covering 2012 had already been released in early 2013). That would give up to 8 years of data coverage and feasible time series to use for the testing phase of the project. In cases where data was released seldom, for example in 5-years cycles, an extended time frame was used, starting in year 2000. For indicators based upon modelling approaches (accessibility indicators, environmental indicators), only selected available years are used.

A third principle was to collect data at specific spatial levels, i.e. NUTS-3 regions in those countries where such exist, e.g. the BSR EU states and Norway, and, for Russia and Belarus, on *oblast* (sNUTS-2) level. For indicators for which NUTS-3 data were not available for the BSR EU states and Norway, NUTS-2 data has been used. The TPG has also investigated the possibilities to go beyond NUTS-3 and sNUTS-2 levels, for example LAU-2. However, considering that for several indicators data on NUTS-3 and sNUTS-2 levels wasn't available, it's obvious that very few, if any, of the indicators will possibly be covered for all countries on LAU-2 or equivalent levels. Also, full coverage beyond NUTS-3 level is not within the scope of the project. However, in annex C2 the topic of monitoring on LAU-2 level is elaborated, and in C3 some examples are provided.

A fourth guiding principle has been the ease of updating the monitoring system. Three main sources have been used, which provide data free of access and in most cases on a yearly basis: For the BSR space (except for Russia and Belarus, since these are not covered by this statistical database), especially for economic and social statistics, the main source has been Eurostat, which aims at including statistical data for all EU and EFTA countries. Equivalent data for Russia and Belarus has been collected at the respective country's national statistical bureaus, ROSSTAT and BELSTAT (or, for Russia, equivalent regional statistical office). In cases where these three data providers don't cover data of the indicator in question, other sources have been used, such as international institutes or agencies (e.g. HELCOM), or previous ESPON (or similar) projects that have produced the data needed. In cases of data gaps, data has been supplemented by data from national statistical bureaus.

A fifth guiding principle has been to make sure that data for the same indicator but from different sources is comparable regarding methodology, availability, etc. This has been of particular importance regarding combining data from BSR EU states and Norway on the one hand (Eurostat methodology) and Russia and Belarus on the other (which in many, although not all, cases, uses the same methodology). This is a major challenge regarding the data usage within the project. In some cases, similar data might exist for all countries within the BSR, but is impossible to combine, due to difference in methodology. In the case of the indicator *Air pollution (PM10)*, for example, data exist for both Russia and Belarus, but cannot be combined with the data for EU countries. For such cases the TPG has received confirmation from Russian statistical experts of PETROSTAT that the data is not comparable. The Russian statistical experts have also asserted those cases where data for Belarus and Russia is entirely lacking, which is the case for some indicators, especially within the domains Access to services, markets & jobs, Innovative territories and Environmental qualities.

Table 5 Data frequency table

Indicator	Territory	Spatial level	Prior years	2005	2006	2007	2008	2009	2010	2011
			1 Data available; 0 Data not available; / Gap due to modelling or project data.; 0.5 Data partly available							
GDP per capita	EU/Eurostat	NUTS-3		0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Russia	Oblast		1	1	1	1	1	1	0
	Belarus	Oblast		0.5	0.5	0.5	1	1	1	1
GDP per person employed	EU/Eurostat	NUTS-3		0.5	0.5	0.5	0.5	0.5	0	0
	Russia	Oblast		1	1	1	1	1	1	0
	Belarus	Oblast		0.5	0.5	0.5	1	1	1	1
Unemployment rate, total	EU/Eurostat	NUTS-3		0.5	0.5	1	1	1	0	0
	Russia	Oblast		1	1	1	1	1	1	0.5
	Belarus	Oblast		1	1	1	1	1	1	1
Employment rate (20-64 years)	EU/Eurostat	NUTS-2		0.5	0.5	1	1	1	1	1
	Russia	Oblast		1	1	1	1	1	1	0
	Belarus	Oblast		1	1	1	1	1	1	1
Net migration rate	EU/Eurostat	NUTS-3		0.5	0.5	0.5	0.5	1	1	0
	Russia	Oblast		1	1	1	1	1	0	0
	Belarus	Oblast		1	1	1	1	1	1	1
Total population change	EU/Eurostat	NUTS-3		0.5	0.5	1	1	1	1	1
	Russia	Oblast		1	1	1	1	1	1	0
	Belarus	Oblast		1	1	1	1	1	1	1
Economic dependency ratio	EU/Eurostat	NUTS-2		0.5	0.5	1	1	1	1	1
	Russia	Oblast		1	1	1	1	1	1	0
	Belarus	Oblast		1	1	1	1	1	1	1
Accessibility potential by road	EU/Eurostat	NUTS-3	2001	/	1	/	/	/	/	1
	Russia	N/A		0	0	0	0	0	0	0
	Belarus	N/A		0	0	0	0	0	0	0
Accessibility potential by rail	EU/Eurostat	NUTS-3	2001	/	1	/	/	/	/	1
	Russia	N/A		0	0	0	0	0	0	0
	Belarus	N/A		0	0	0	0	0	0	0
Accessibility potential by air	EU/Eurostat	NUTS-3	2001	/	1	/	/	/	/	1
	Russia	N/A		0	0	0	0	0	0	0
	Belarus	N/A		0	0	0	0	0	0	0
Multi-modal accessibility potential	EU/Eurostat	NUTS-3	2001	/	1	/	/	/	/	1
	Russia	N/A		0	0	0	0	0	0	0
	Belarus	N/A		0	0	0	0	0	0	0
Functional areas: access to cities	EU/Eurostat	Grid, NUTS-3		/	/	/	/	/	/	1
	Russia	Grid, NUTS-3		/	/	/	/	/	/	1
	Belarus	Grid, NUTS-3		/	/	/	/	/	/	1
Population potential within 50km	EU/Eurostat	Grid, NUTS-3		/	/	/	1	/	/	/
	Russia	N/A		0	0	0	0	0	0	0
	Belarus	N/A		0	0	0	0	0	0	0
Border crossings	EU/Eurostat	Border crossings	2000	1	0	0	0	0	0	0
	Russia	Border crossings	2000	1	0	0	0	0	0	0
	Belarus	Border crossings	2000	1	0	0	0	0	0	0
Households with internet access at home	EU/Eurostat	NUTS-2		0	0.5	0.5	0.5	0.5	0.5	0.5
	Russia	N/A		0	0	0	1	1	1	1
	Belarus	N/A		0	0	0	0.5	0.5	0.5	0.5
Population with tertiary education (25-64 years)	EU/Eurostat	NUTS-2		0.5	0.5	1	1	1	1	1
	Russia	N/A	2002	0	0	0	0	0	1	0
	Belarus	N/A		0	0	0	0	1	0	0
Employment in technology & knowledge sectors	EU/Eurostat	NUTS-2		0.5	0.5	1	0.5	0	0	0
	Russia	N/A		0	0	0	0	0.5	0.5	0.5
	Belarus	N/A		0	0	0	0	0	0	0
Gross-domestic expenditures on R&D, business	EU/Eurostat	NUTS-2		0.5	0.5	1	1	1	0.5	0.5
	Russia	N/A		0	0	0	0	0	0	0
	Belarus	N/A		0	0	0	0	0	0	0
Gross-domestic expenditures on R&D, total	EU/Eurostat	NUTS-2		0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Russia	N/A		0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Belarus	N/A		0	0	0	0.5	0.5	0.5	0.5
At-risk-of-poverty rate	EU/Eurostat	NUTS-2		0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Russia	Oblast		1	1	1	1	1	1	0
	Belarus	Oblast		1	1	1	1	1	1	1
Severe material deprivation rate	EU/Eurostat	NUTS-2		0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Russia	N/A		0	0	0	0	0	0	0
	Belarus	N/A		0	0	0	0	0	0	0
Youth unemployment rate (15-24 years)	EU/Eurostat	NUTS-3		0	0.5	1	1	0.5	0.5	0.5
	Russia	Oblast		0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Belarus	N/A		0	0	0	0	0.5	0	0
Gender imbalances	EU/Eurostat	NUTS-3		0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Russia	Oblast	2003	0	0	0	0	0	0	1
	Belarus	Oblast		0	0	0	0	0	1	1
Life expectancy at birth, in years	EU/Eurostat	NUTS-2		0.5	0.5	1	1	1	0.5	0
	Russia	Oblast		1	1	1	1	1	0	0
	Belarus	Oblast		1	1	1	1	1	1	1
Self-assessed general health status	EU/Eurostat	NUTS-2/NUTS-3		0	0.5	0	0.5	0	1	0
	Russia	Oblast		0	1	0	1	0	1	0
	Belarus	N/A		0	0	0	0	0	0	0
New soil-sealing per capita	EU/Eurostat	NUTS-3		/	0.5	/	/	/	/	/
	Russia	N/A		0	0	0	0	0	0	0
	Belarus	N/A		0	0	0	0	0	0	0
Air pollution (PM10	EU/Eurostat	NUTS-3		/	/	/	/	0.5	/	/
	Russia	Oblast		0	0	0	0	0	0	0
	Belarus	Oblast		0	0	0	0	0	0	0
Eutrophication	EU/Eurostat	Per sea area		0	0	0	0	0.5	0.5	0
	Russia	Per sea area		0	0	0	0	0.5	0.5	0
	Belarus	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fragmentation index	EU/Eurostat	NUTS-3	2002	/	/	/	/	1	/	/
	Russia	N/A		0	0	0	0	0	0	0
	Belarus	N/A		0	0	0	0	0	0	0

2.3. Visualisation concept

An important part of the monitoring system is the visualisation of results and analysis. This concerns the implementation, analysis and output of results and indicators (figure 4).

The monitoring system contains three types of ***analytical approaches***, which are the portraying of disparities at one point in time, to look at developments over time (trends), and to benchmark the Baltic Sea Region with other macro regions in Europe. The ability of the system to perform those three types of analysis was examined within the four test cases of overall benchmarking, territorial cohesion, cross-border regions, and migration. The results of these applications are provided in Volume C4 of the TeMo Scientific Report.

As ***outputs***, results are documented in maps (i.e. the main form of illustrations in ESPON), diagrams, as well as in tables and as time series graphs.

All these are ***implemented*** as map templates in a GIS (ArcGIS), are laid down in tables and Excel files, and are made available to the user through an easy-to-use browser application, the so-called *Presentation Tool*.

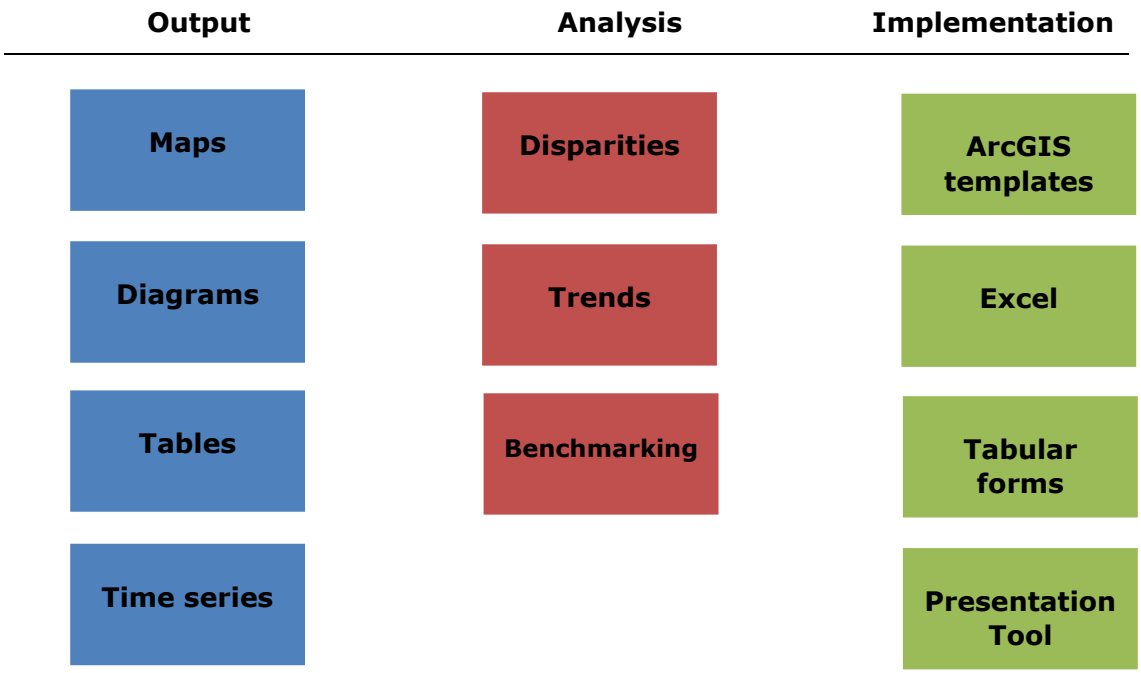


Figure 4 Presentation and visualization framework

The visualization concept foresees a flexible framework, where all output, analysis and implementation components tightly integrate with each other. ArcGIS map template files create indicator maps based upon the integrated TeMo GIS database. From ArcGIS, maps can be exported in PNG, AI or SVG file formats into the specifically designed folder structure, from where the *Presentation Tool* loads and illustrates the exported maps, as well as charts and project documentations.

Based upon the system description above, in fact the territorial monitoring system for the BSR is composed of different tiers; each tier subsuming a set of further elements. These five tiers are:

Tier 1: Techniques
Tier 2: Data and indicators
Tier 3: Analyses
Tier 4: Output
Tier 5: Documentation

Concerning the ***technological basis*** (tier one), ArcGIS map templates, lyr files, a browser application and a dedicated structure are utilized. ***Data and indicators*** are the second tier, composed of statistical data, the defined indicators, organized in a system of domains and subdomains, and physically implemented in a dedicated database. The third tier, the ***analyses*** tier, builds upon both previous tiers, conducting different types of analysis, such as analyzing disparities, trends, benchmarking and other forms of ESPON-wide comparisons. Results of the analysis tier are communicated through maps, charts, tables and as time series, as system ***output***. Finally, the ***documentation*** tier summarizes and explains the monitoring system in form of reports, user manual, a dissemination publications, technical specifications and indicator metadata.

2.3.1. Concept for simple indicators

The main part of the monitoring system is the analysis of the indicators. Every indicator is presented and analyzed in a standardized way. The indicator presentation consists of three parts (Figure 5):

(i) the textual part,
(ii) data part, and the
(iii) visual part (maps).

Part 1, the textual parts, covers indicator definition, indicator importance, indicator findings, recommendations for the implementation, as well as the metadata. Part 2, the data part, covers basic statistics at national level (minima, maxima, mean, coefficient of variation), as well as access to the indicator numbers in tabular format. Part 3, the visual part, comprises the indicator maps. Three standard maps are defined for each indicator, which are the BSR map for the latest available year, the ESPON space map for the latest available year, and a difference maps for the BSR.

As far as data availability allows, additional maps are produced. These may be maps for alternative years, to represent a time series, or specialized maps illustrating border discontinuities. In consequence, the number of maps produced for each indicator varies, subject to data availability.

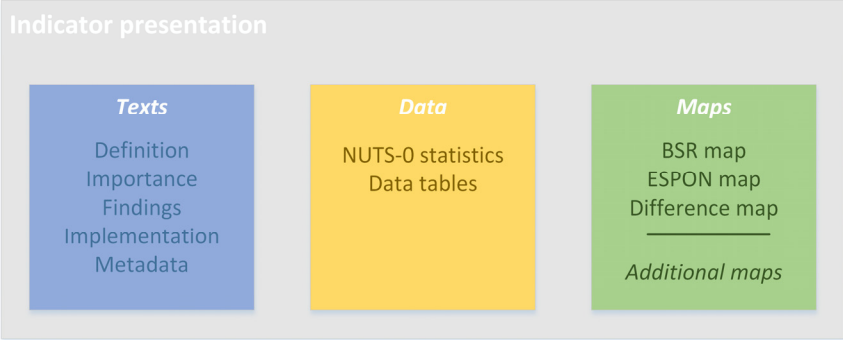


Figure 5 Standardized indicator presentation - details

The *Presentation Tool* implements these standard elements, as Figure 6 shows.
The main indicator page already provides the indicator definition, indicator importance, and the findings, together with the main indicator map, illustrating the BSR.

Figure 6 Indicator page in the Presentation Tool

The navigation bar at the left hand side allows switching to implementation and metadata tabs (text), switching to the tables&maps or statistics tab (data), or allows switching to the map gallery, where all maps generated under one indicator are presented (maps).

This type of indicator presentation is not only available in the software, the *Presentation Tool*, but it is also followed in Volume C3 of the TeMo Scientific Report, where each indicator is described by using the same structure.

2.3.2. Concept for advanced module

While the simple indicator part of the monitoring system analyses individual indicators, the advanced module is dedicated for cross-sectoral, cross-indicator analyses, by relating different indicators with each other, and by producing advanced indicators through statistical procedures (such as GINI coefficients etc.).

In the TeMo project, demonstration examples for the advanced module are developed as part of the 4 test cases, and similar to the simple indicator presentation, the demonstration examples are presented in a standardized way, despite their different characteristics, based upon texts and illustrations (Figure 7).

Texts refer to the description of the advanced module, its policy context, the results, and to data sources. Illustrations mainly refer to a series of diagrams, individual specific maps, as well as summary tables. This concept is implemented in the application section of the *Presentation Tool.*

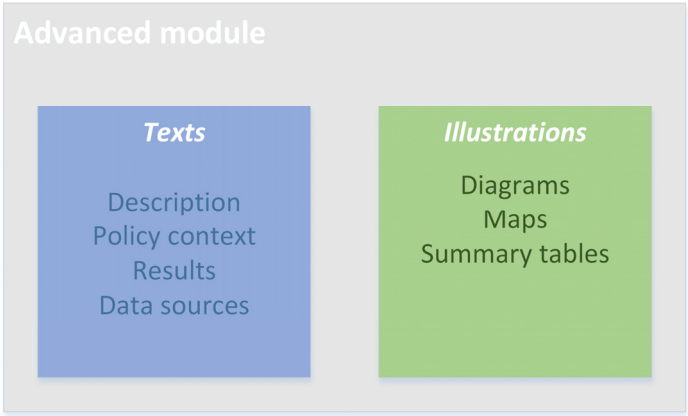


Figure 7 Standardized advanced module presentation

Unlike the simple indicator presentation, where visualization mostly relies on maps, visualization in the advanced module focusses on diagrams, complemented by selected tables and maps. Diagrams comprise bar and line charts, box and scatter plots, and summary tables. In the *Presentation Tool*, all these charts are accompanied with brief texts describing the main findings (Figure 8). The number and actual type of charts differs for each application, representing their different characteristics and policy relevance.

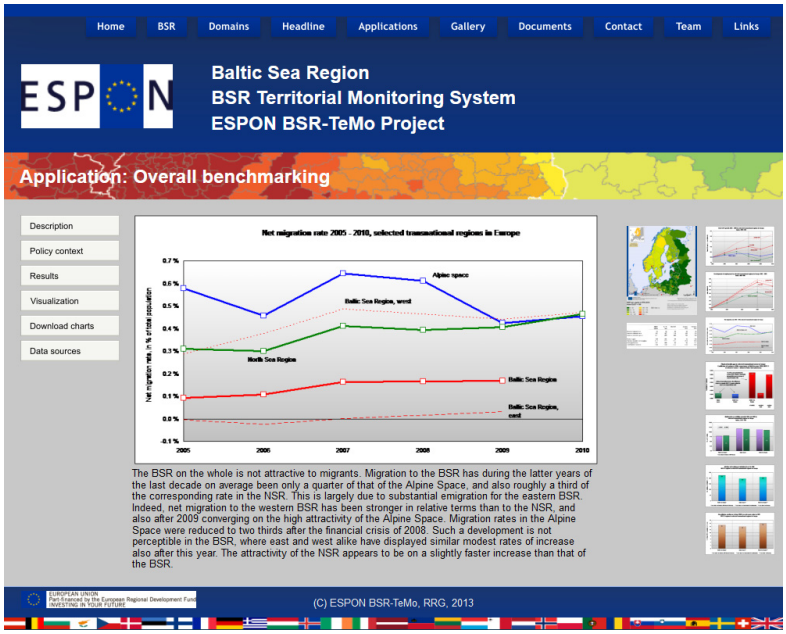


Figure 8 Charts and descriptions in the advanced modules

2.4. Presentation Tool

The easy-to-use *Presentation Tool*, the browser application, not only provides access to the indicator maps, but also grants easy access to the domain and subdomain descriptions, indicator metadata and indicator descriptions, as well as to specific implementation recommendations for each single indicator. All this information can of course also be printed or exported from within the browser application. Figure 9 illustrates the starting page of the *Presentation Tool*.

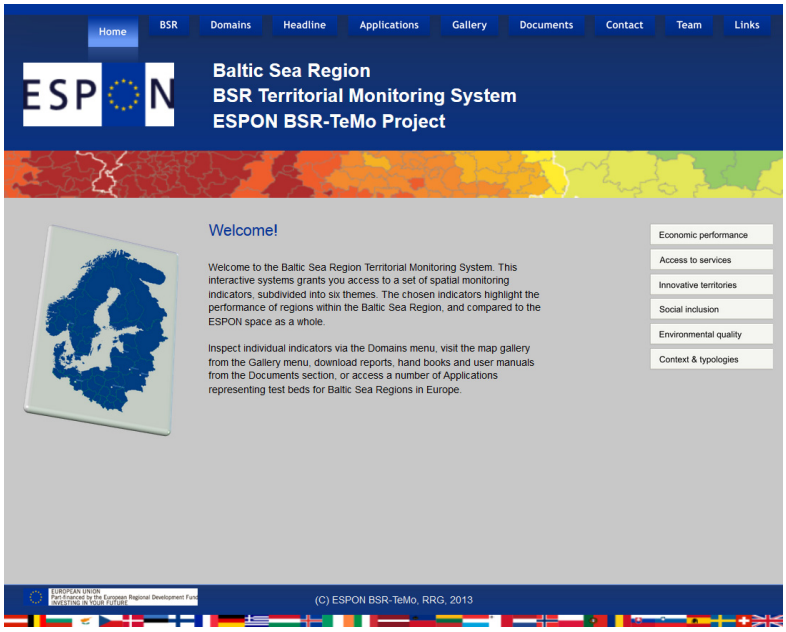


Figure 9 Starting page of the Presentation Tool as Gateway to the Monitoring System

While a similar concept for the underlying GIS database and folder structure has already been developed in the framework of the ESPON INTERCO project (see Chapter B.2.3 of Final Report of ESPON INTERCO; Dao et al., 2012), the *Presentation Tool* is a new development on top of the INTERCO approach. One of the deficits of the INTERCO approach was that, despite the well-structured database and folder structures, the user still had to know where to look for which kind of information. Thus, she/he had to navigate through folders and subdirectories in order to obtain the information she/he is interested in[6]. In TeMo, the *Presentation Tool* is designed in a way that the user is guided by simple hyperlinks and navigation bars, representing the domains and subdomains. In times of widely used web applications, most users are familiar with such browser-based applications, thus no technical objectives should prevent people from using the system. Moreover, the *Presentation Tool* releases the user to know where actually a map file, a table or a document is stored, in order to retrieve the relevant information. Even though far from representing latest state-of-the-art technologies, from a technical point of view, the *Presentation Tool* represents a robust and sound solution tailor-made for politicians to easily interact with the monitoring system.

The Potsdam VASAB Stakeholder assessment (for workshop minutes see Volume C10 of the TeMo Scientific Report) clearly showed the need for such a smart application. At the same time, for experienced users, the GIS database and also the Excel files are still available allowing further in-depth analysis.

The TeMo *Presentation Tool* acts as the standard gateway for the users to access the territorial monitoring system for the Baltic Sea Region, implemented as a simple and easy-to-use browser application. It provides access to the following TeMo output:

- Domains, subdomains and indicators
- Headline indicators
- Demonstration examples and case studies
- Map files and Excel files
- Documents and reports
- Relevant ESPON, VASAB and INTERREG websites
- TPG and contact information

When the user navigates through the domains and subdomains, he can select the indicator he is interested in. Each indicator is presented on one dedicated page, subdivided by tabs, with indicator description, map gallery, statistics, tables and map download, implementation, and metadata. Headline indicators can furthermore directly be accessed via the tool.

In addition to the presentation of individual indicators, the *Presentation Tool* is also gateway to the demonstration examples and case studies. Initially, four demonstration examples are being developed in the TeMo project: (i) overall benchmarking, (ii) migration (thematic scope), (iii) cross-border areas (geographical scope), and (iv) territorial cohesion (cross-cutting issue).

All maps and Excel files produced are made available through the presentation tool, either indicator-by-indicator via the indicator pages, or from the application pages. All documents produced in TeMo are also accessible through the browser application. The

[6] The ESPON INTERCO Final Report is only of little help for the user in this respect. Even though INTERCO already strived for a standardized indicator presentation, the full indicator description including maps, charts, metadata and descriptive texts required almost 140 pages, which the user has to scroll to find the information he is interested in.

documents can be downloaded as PDF files from the application, partly in both English and Russian versions.

The navigation bar (Figure 10) is accessible from all pages of the *Presentation Tool*.

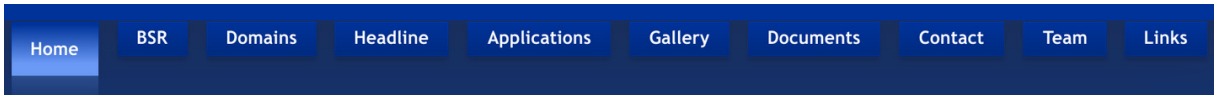


Figure 10 Navigation bar

The ***BSR*** menu gives access to a general introduction to the Baltic Sea Region in terms of physical map, administrative situation, spatial structure, and transportation networks. From the ***Domains*** menu, the user can select one of the five domains and from there the respective indicators. The individual indicator pages then provide indicator definition, results, indicator maps and statistics, Excel file and map downloads, and indicator metadata in a standardized way. The ***Headline*** menu grants fast access to the headline indicators. From the ***Applications*** menu, one can select any of the four implemented demonstration examples, which are also presented in a standardized way, including application description, policy context, results, illustrations (charts, maps and tables), and download options. The ***Gallery*** menu provides quick access to all produced maps, followed by the ***Documents*** menu where all TeMo documents can be viewed or downloaded in PDF file format.

Finally, the navigation bar provides ***Links*** to relevant ESPON, VASAB and INTERREG websites, as well as company and ***Contact*** information about the TeMo transnational project group, implementing this monitoring system.

Advantages of the Browser Application

The advantages of implementing the *Presentation Tool* as browser application can be summarized as follows:

- *Information access*: it is the central gateway of TeMo to access all information from within one application, i.e. from one place, in an easy manner. Indicator description and maps, findings, charts, Excel files and benchmarks will be accessible through this gateway, so as metadata, domain, subdomain and indicator descriptions.
- *Domain, subdomain and indicator-driven approach*: The application follows a domain, subdomain and indicator-driven approach. Navigation is guided by the domains, subdomains and indicators, as its building blocks. At the lowest level, all information for one single indicator are presented at one place, at one hand.
- *Hyperlink navigation*: The browser application will rely on simple hyperlink navigation. The application guides the user through the domains, subdomains and indicators by simply clicking on hierarchical hyperlinks. Since the beginning of the WWW, people are familiar with this concept of user interaction.
- *Independence from software or OS requirements*: The browser application is based on simple HTML techniques. Other (commercial) software than web browsers are not required to run the application. Moreover, a browser application based on HTML is independent from any operating system, and does not need to be formally installed. Just a click on the starting html file will open the application.
- *Independence from GIS*: The browser application is also independent from any GIS software. ArcGIS or other GIS software is not needed to launch the

monitoring system; however, interested GIS professionals can use ArcGIS or other GIS software to do their own types of analysis.

- *Enhanced contents*: Compared to the standard ESPON reports, where there is only limited space to present several indicator maps, the web browser tool allows to implement a series of map for every indicator such as state maps for several years, different difference maps, discontinuity maps, as well as similar maps from related studies. By that the presentation tool includes enhanced contents, offering more options and higher flexibility for the users.
- *Easy sharing*: The entire monitoring system including all input data, maps and Excel files can also be delivered on as a local browser, e.g. on a portable storage device. The browser application can be launched directly from this medium, or, after copying the contents of the system to a local hard drive, on any PC. The monitoring system, along with all its components, can then easily be shared with interested people just by handing over the files.
- *Easy implementation*: A territorial monitoring system based upon HTML standards is rather easy to implement for the TPG, compared to developing dedicated software.
- *Website options*: Finally, the browser application based on HTML can be easily transformed into a formal website without significant amendments, if ESPON or VASAB are requiring this in the future. The TPG has already implemented this solution and hence the presentation tool can be made available online as soon as files are placed on a server and an address allocated.

Thus, from the central *Presentation Tool*, all other elements of the monitoring system can be accessed easily, without changing the medium.

3. Application and testing of the monitoring system

Testing of the TeMo monitoring system consists of three consecutive sub tasks / research steps which are:

(i) Identification of test cases

(ii) Implementation and testing

(iii) Critical evaluation

The first step was implemented through two stakeholder meetings as well as through the communication from the ESPON CU on the Inception and the Interim Report. These stakeholder meetings also made it clear that the desired testing of the monitoring system was twofold: one being a content-driven testing, i.e. analysing the indicators' ability to provide input to current BSR policy making, and one being of more technical nature, i.e. evaluating the performance of the developed monitoring system with regard to indicators and data coverage.

The second step, Implementation and testing, and the third step, Critical evaluation of the monitoring system, were performed based on the concrete content of the monitoring system.

3.1. Implementation and testing

The objective of the testing of the monitoring system is to establish the functionality of it by pushing its analytical capacity in a selection of "real life situations", where its ability to feed relevant information into a policy process constitutes the key parameter for assessing it. During a process involving key BSR stakeholders, four particular investigative areas were agreed upon, reflecting current policy debates in the BSR, namely testing its:

- ability to handle **cross-cutting issues**, where the overarching theme of **territorial cohesion** is able to utilise most of the information in the monitoring system
- functionality within a pronounced **thematic focus**, where **BSR migration** is highlighted;
- functionality to depict a particular **geographic scope**, where **BSR border regions** were deemed of specific interest; and finally
- **overall benchmarking** ability, where the BSR is benchmarked against the **Alpine Space and the North Sea** transnational regions.

Below follows a summary of a selection of key findings encountered during this testing. Due to the limited space available here, we have opted for presenting the material in one single narrative rather than as four separate case studies. For elaboration please refer to Volume C4 of the TeMo Scientific Report.

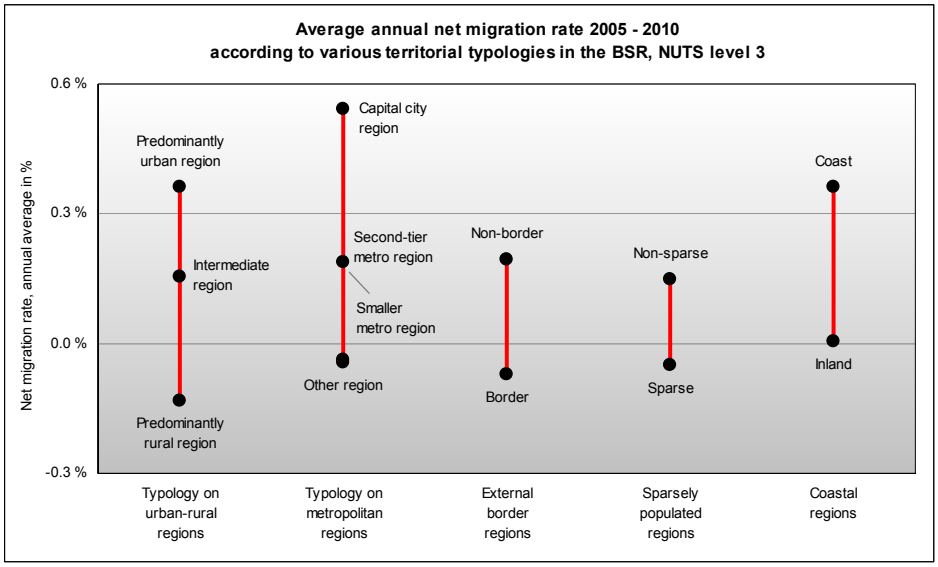
3.1.1. Ongoing BSR polarisation across most socioeconomic realms

As has been the case for the past 20 years or so, also recent trends in general territorial development in the BSR point towards increasing spatial polarisation. At a general level this polarisation looks surprisingly similar across most domains of the socioeconomic sphere encompassing among others structural and dynamic demography, economic development, economic vulnerability, innovation, entrepreneurship, the knowledge economy, lack of polycentric urban structures, social development, and so forth.

The general pattern of this ongoing development in the BSR can be illustrated for example by Figure 11, which depicts average net migration rates for various types of BSR territories 2005-2010. On the urban-rural axis, predominantly urban regions are taking a clear lead whereas predominantly rural regions on the other hand are at the bottom end of the scale.

When addressing the issue from the point of view of a more pronounced urban hierarchy, a very similar pecking order emerges, where capital city metropolitan areas exceed all other types of regions, and only ten urban regions (out of 238 regions in total) swallow 47 % of all migration surplus in the BSR.

What is more, border regions, sparsely populated ones, as well as inland areas all appear hampered by negative, or in the case of inland areas at least in relative terms lower, levels of migration.



Data source: Eurostat, Belstat, Rosstat. NW Russia: 2005-2009; Finland & Denmark: 2007-2010.

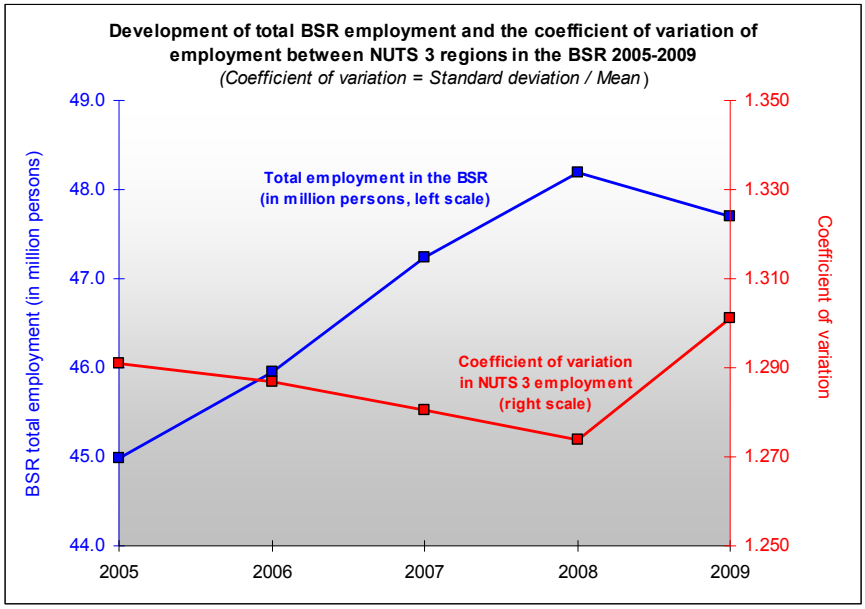
Figure 11 Net migration rates according to various typologies in the BSR 2005-2010

Similar trends of concentration and/or polarisation by and large also reflect most other strata of socioeconomic development. There are exceptions, though. The concentration of economic value-added for example has not showed a clear core-periphery pattern. Rather, the main general dividing factor is that of between east and west, a gap which in this respect is being diminished.

3.1.2. Weak resilience of vulnerable areas

When examining the spatial distribution of new jobs in the BSR a clear polarising development trend is apparent. Total BSR employment grew continually up till 2008 (Figure 12, blue line), after which it subsequently decreased. The parallel downward slope in the coefficient of variation of regional employment (red line) indicates that when the number of jobs increased in the BSR, this increase was beneficial to most smaller regions in the area (as intraregional differences were reduced).

However, when the number of jobs started to decrease as a result of the financial crisis of 2008, that decrease was not evenly distributed among the regions, resulting in a concentration to larger regions; exemplifying the weak resilience of rural and/or peripheral areas in front of external economic shocks.



Data source: Eurostat, Belstat, Rosstat. sNUTS-2 for Belarus and NW Russia.

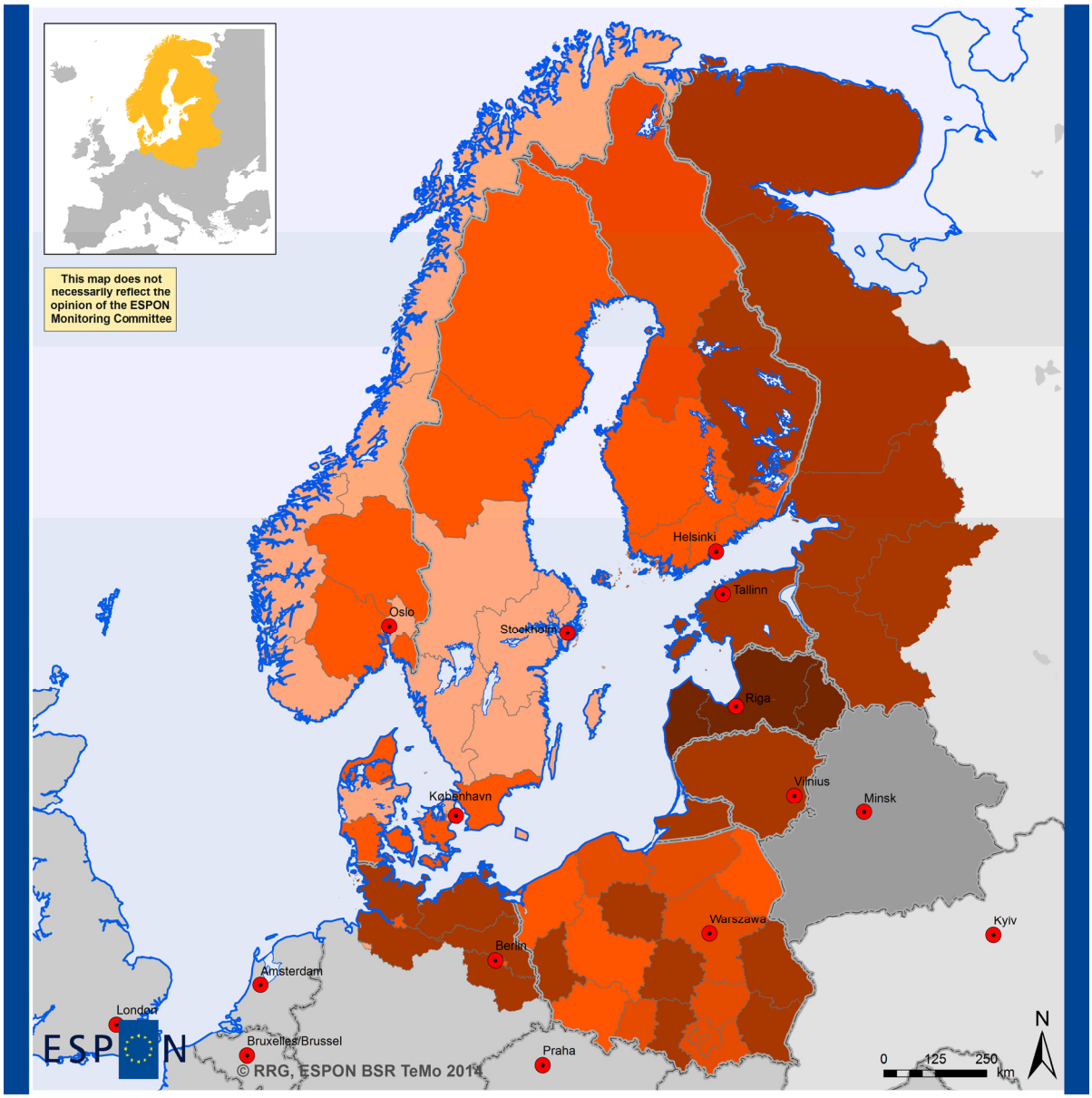
Figure 12 Employment stratification of the BSR 2005-2009

Looking specifically in what kind of locations these jobs were created, new employment has followed a rather strict hierarchical ranking of settlement types, where capital regions have gained most jobs, followed by second tier metropolitan areas. Smaller metro regions (i.e. typically SMESTOs), have also fared well, but new job creation has not been as fast in the remaining regions, which are primarily rural and/or peripheral. Differences in this growth phase between different types of regions were to a certain extent clear, however not enormous.

More alarmingly however, the post-crisis loss of jobs had a considerable spatially segregating pattern, as the least urbanised areas were the ones to be hit hardest, an expression of the economic vulnerability of smaller settlements the BSR.

3.1.3. Social inclusion: the east-west axis is the norm, but with some exceptions

The eastern BSR displays huge internal variations in life expectancy and the gap to western BSR is substantial. The development trends are cohesive, however. In terms of general health (figure 13), the east-west divide is not clear-cut. Economic welfare explains only partly existing patterns in health. East-west differences in both relative and absolute poverty are fairly large in the BSR, but no straightforward territorial pattern is discernible.



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Regional level: NUTS-2; Russia: oblasts
Data source: European Social Survey
© RRG GIS Database, 2013
© EuroGeographics Association for administrative boundaries

Self-assessed general health status (2010)
Regional average of all respondents

- 1,8 - 2,0 (average regional health status assessed as rather good)
- 2,0 - 2,2
- 2,2 - 2,4
- 2,4 - 2,6
- 2,6 < ... (average regional health status assessed as rather poor)
- Data n.a.

Self-assessed general health status on a scale of 1-5, where 1="very good"; 5="very bad". Åland and Latvia: 2008, NW Russia: Data for entire Northwest Federal District

Figure 13 Self-assessed general health status in the BSR 2010

3.1.4 Convergence trends also discernible

The employment rate indicates the share of persons in a region economically supporting all those that do not work. In the BSR during recent years, this development displays very cohesive patterns despite the above indicated spatially segregated job creation. In general, regions with the lowest employment rates have seen the (on average) fastest increases. This holds true for east and west BSR alike. The only major exceptions to this general pattern are the vast majority of Polish regions, of which most have seen only modest increases far below those of their corresponding peer regions in the rest of the BSR.

There is also a similar convergence process in the BSR regarding tertiary education, as those regions where levels are lowest tend to have the highest increase rates. This convergence process concerns eastern and western BSR alike. In contrast, for instance the R&D intensity still splits BSR first and foremost in East and West with no clear convergence trend in sight.

3.1.5. Reaching EU 2020 employment targets

The generic EU 2020 target is that the EU should have an employment rate of 75 % (for the age group 20-64 years) by the year 2020. In addition, there are separate national target rates that reflect national "on the ground" differences. The BSR is divided in this respect, but bringing all BSR regions up to these rates would correspond to (or require) between 1.6 and 2.0 million additional jobs to the BSR.

Taken as a group, the gap between eastern and western BSR appears rather consistent, implying that no macro level convergence is taking place between the two shores of the Baltic Sea.

Figure 14 attempts to predict whether or not the BSR regions will be able to reach the overall EU targets and/or the corresponding national ones by 2020 (utilising the average development 2005-12).

Among the EU MS, seven regions of which two in BSR Germany, two in Finland and three in Sweden have already reached both generic EU as well as their respective national target rates. A further six regions are expected to reach both these by 2020. Of these, three are Swedish, two German and one Polish.

14 NUTS-2 regions in the EU parts of the BSR are projected to reach neither their national target rates, nor the corresponding EU one. Apart from all three Baltic States, two Finnish and two Danish regions as well as seven Polish ones belong to this group.

3.1.6. Specific territories in the BSR on the tightrope

Recognising territorial diversity has attended increased focus in the latter years and is bearing substantial relevance for the BSR, as the region is in this respect extremely heterogeneous by its character.

Looking at employment change, by and large familiar patterns emerge. During the period 2005-2009, particularly sparse, border and rural regions have experienced considerably worse development that their thematic counterparts. That coastal regions on average have fared worse than inland ditto, is to a large extent depending on the fast employment growth in Poland (of which a majority of regions are not by the coast).

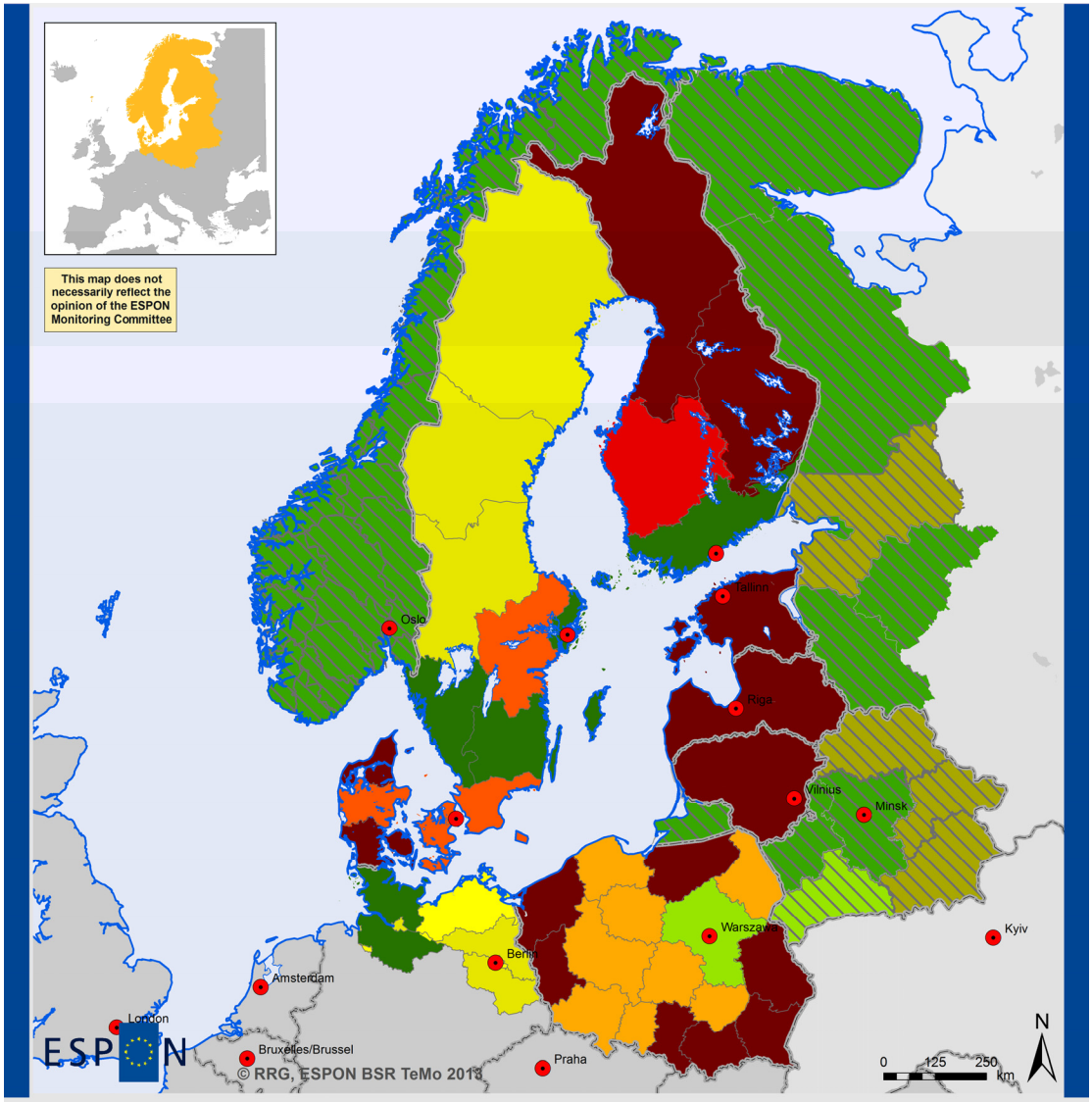

Figure 14 Projected achievement of EU 2020 strategy employment rate targets for the BSR

The outspoken urban-rural dimension of these typologies requires further examination. Regarding different forms of metropolitan regions, one may say that the dividing factor is between non-urban and urban, but regarding the latter not in a strictly hierarchical manner. The heterogeneousness of the BSR implies that the size of the metropolitan area as such appears of lesser importance, and other factors bear greater relevance.

However, at the same time interpreting the top notch of the urban-rural typology, we once more see the predominantly urban regions in the lead. What follows then is divided primarily along a remoteness scale rather than along the different "levels" of urbanity. Remote regions, be they intermediate or predominantly rural, have fared worse than their non-remote (i.e. "close to a city") respective counterparts.

Border regions in general still today perform worse than the rest of the BSR and they are particularly severely handicapped when examined in their national context. Net migration in external border areas is down to less than half that of their respective countries, employment change some 11 % worse, unemployment rate some 5 %-units higher, GDP/capita 12 % below, and accessibility some 18 % below.

A spatio-temporal view on recent developments highlights the vulnerability of specific types of territories in the situation of external shocks. Regarding the drop in the employment rate in the aftermath of the 2008 credit crunch, predominantly urban regions appear to have walked largely untouched through the financial crisis, which is not the case for the other types. The drop was particularly steep for remote regions, be they rural or intermediate, a manifestation of the weak urban structures in large tracts of the BSR.

A similar notch is also discernible for sparsely populated regions. For example, sparse regions only accounted for some 2 % of the total employment increase during the years 2005 and 2008, but accounted for nearly 11 % of the total BSR decrease between the years 2008 and 2009.

Also border regions appear very vulnerable to external economic shocks. Following the economic crisis of 2008, these regions have experienced a much steeper fall in e.g. migration or a much larger relative decline in employment than have the non-border areas of the BSR.

Albeit we have here not specifically studied island or mountain regions (due to statistical reasons), they nonetheless share very similar challenges with peripheral, sparse and rural regions, i.e. out-migration, weak demographic and economic structures, dependency on primary production or seasonal tourism, low levels of education, etc.

Coastal regions in the BSR on the other hand are by nature generally less peripheral, more urbanised and better connected than typical inland regions. Most BSR capitals are situated by the coast, as is the case with a vast majority of the other larger urban metropolitan regions, Belarus (axiomatic) and the larger inland cities in BSR Russia constituting the major exceptions. In coastal areas, the development challenges are rather different, related more to land use pressure, rapid urbanisation and other immediate or (causally constituted) mid- or long-term challenges.

3.1.7. Background factors for population concentration: territory matters

A multivariate data analysis indicates that among the specific territorial features relevant for the BSR, the east-west dimension has by far the strongest influence on migration. Also having the status as the national capital or a secondary city, being a predominantly urban or an intermediate region, as well as lying by the coast, all have a positive effect on net migration.

Sparsity, closeness to a city as well as border status however do not affect migration when all other aspects are held constant. It is important to note that it should not be interpreted as if such characteristics would not matter. Rather to the contrary, the results reveal specifically the persistently handicapping socio-economic and locational characteristics of these areas for which targeted policies are direly needed. Hence: territories matter.

3.1.8. Specific territories also an asset

Specific territories represent not only a burden, but also an asset. For instance external border regions represent a large economic contribution potential that still to-day appears underutilised. Between 2009 and 2010, border regions accounted for more than 13 % of the total BSR economic growth, a value-added far beyond their relative share of the economy.

Similarly, sparse regions accounted for 11.4 % of the corresponding value added in the BSR, remote regions for 11.4 %, non-metropolitan regions (i.e. not capital, not secondary, not smaller metro region) for as much as 37.6 %, and so on, testifying the economic contribution potential of such areas.

3.1.9. Time to re-consider traditional territorial divides of the BSR

The perceived main division in the BSR in the 1990s was the east-west one, stretching from the White Sea to the Pomeranian bay. In addition to this only a few scattered material welfare pockets were discernible, primarily around capital regions such as Tallinn or Warsaw, as well as to a lesser extent around other ten or so major urban nodes.

In the past 15 years, this overarching pattern has changed. Arguably, the heavy east-west division across the Baltic Sea still exists, but already it has a few "cracks" in it, such as on certain stretches at the Finnish-Russo border, for example (Figure 15). The largest difference to the situation 15-20 years ago is a virtual explosion of disparities among adjacent regions inside countries in particularly the eastern BSR.

A vast assortment of new "islands of wealth" has emerged, typically surrounding major metropolitan areas.[7] What is more, also other internal discrepancies are nowadays much sharper than was the case before, the most striking case in the eastern BSR being increased regional disparities in BSR Russia. On average border disparities in eastern BSR are some ten percentage units higher than those in the western parts of the region. Increasing polarisation in the Nordic countries is evident and also manifested in growing intraregional disparities. In contrast to the past, all capital regions in the Nordic countries do nowadays show substantially larger barriers vis-à-vis their surrounding areas than was the case previously. A similar pattern also exists in BSR Germany.

[7] The gradual increase in commuting explains one part of the increase in discrepancies, since commuting affects the GDP/capita values in favour of urban cores. The increase in commuting however is not the major explanatory factor.

It is both evident as well as expected that the urban hierarchy is a decisive factor across the BSR in dictating the magnitude of on-the-ground territorial disparities.

Two decades ago, the main territorial disparities in the BSR were primarily a case between the very wealthy and the very poor, whereas the situation today appears to be much more multifaceted. Disparities are now frequent both across as well as within all layers of development, i.e. we also see a large polarisation between wealthy and ultra-wealthy, poor and ultra-poor, not forgetting the middle strata as well.

When instead examining local disparities in unemployment rates in a similar manner we see that in such a more pronounced social context, the patterns are substantially different. First, the primary divide appears to be between countries rather than within them, reflecting a situation where labour market policy in general is more a national than a regional affair. Second, as high unemployment (as well as other related social challenges) does not conform to the urban-rural dichotomy (i.e. the urban paradox) we for the most part see no particularly large discrepancies between major metropolitan areas and their surrounding territories. Rather, high trans-regional disparities in unemployment tend to be tied to regional industrial transition processes.

3.1.10. General reduction of national border discrepancies

The highest national welfare gap across any land border stretch within the BSR exists between Belarus and Lithuania. In comparison to the Lithuanian-Belarusian border, disparities on the Finnish-Russian border actually appear quite modest. In contrast to the former (LT-BY border), the relative differences across the Finnish-Russian border have however decreased substantially in only five years. Moving in the other direction in turn are primarily northern Nordic border stretches, where disparities in general have increased.

3.1.11. Territorial cohesion in the BSR: a synthetic multidimensional assessment

We also make an approach to synthesize the different BSR patterns and trends into one compact and coherent package utilising ten specific macro level indicators that cover all major aspects of territorial cohesion in the BSR, i.e. distribution, convergence, and specifically targeted BSR cohesion objectives (for descriptions of the ten indicators, please see chapter 2.1.2).

3.1.12. Main message: increasing concentration in and polarisation of the BSR

The ten indicators reveal that during the latter half of the past decade, the BSR has at a macro level undergone a process of increased concentration. The re-distribution of economic activity, jobs and humans has by and large been a case of polarisation, where those in the most vulnerable position have taken the worst beating.

The indicators further revealed that the gradual shift of value-added from the smaller to the larger regional economies of the BSR, and simultaneously from the richer to the poorer ones, has primarily been a process of a relative decline of smaller but wealthier regional economies (i.e. western BSR peripheral/rural regions) in relative favour of large but less wealthy ones (i.e. eastern BSR, capital and other metropolitan areas). Or in other words: a simultaneous process of polarisation and cohesion, depending on the level examined. It appears as though the largest fall-between class are the small peripheral and/or rural regions in particularly the eastern BSR.

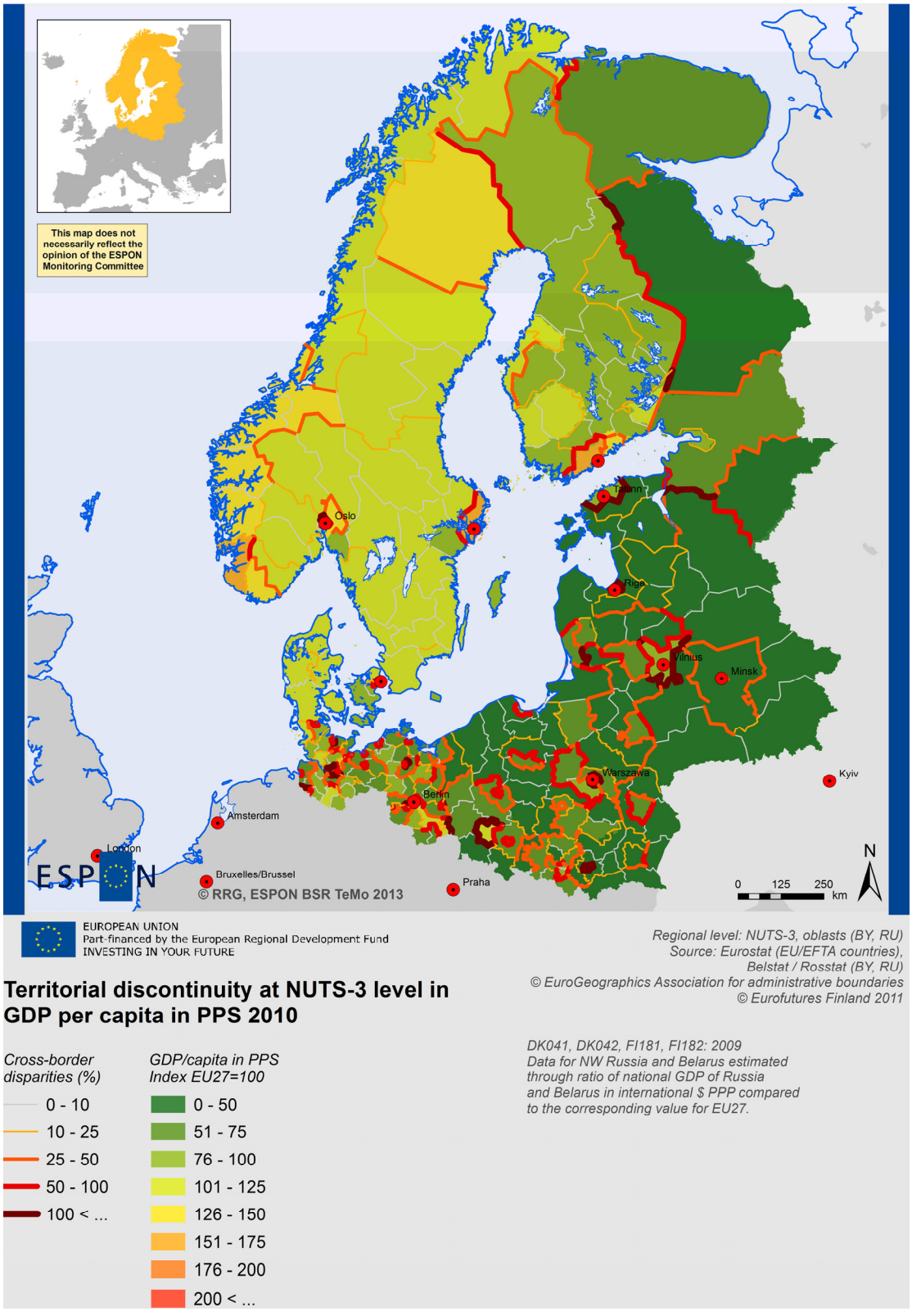

Figure 15 Territorial discontinuity of GDP/capita in the BSR 2010

3.1.13. The three principal divides of the BSR

The indicators also revealed that BSR **east-west divide** is still alive and kicking, but particularly in issues related to economic development, the gap is in a more or less steady process of being eradicated. The sharpest divide today is tentatively within the social sphere of development.

Concerning the **north-south divide**, sparse regions (together with border regions) are in general the most disadvantaged types of territories and are largely lagging behind in most aspects of socioeconomic development, particularly when examined in a national context. Such evidence can be found in migration patterns, weak demographic structures, and naturally physical accessibility. On the last point, recent changes (2001-2006) indicate also that the situation for the sparsely populated areas is getting worse despite investments in transport infrastructure.

The last of the three BSR divides is in many respects the most difficult to grasp. Yet, it is tentatively also the most profound among the three. Indications point towards a strengthening also of the **urban-rural divide** where territorial gaps in the BSR are most pronounced in the light of the urban hierarchy. With very few exceptions the rural areas generally occupy the bottom positions regarding most aspects of socioeconomic development. Demographic structures are weak, rural areas have an accessibility some 20 % lower than the BSR on average, and more than 40 % lower than urban areas. The core rural areas are handicapped by lack of opportunities for economic development outside the sphere of primary production, often low levels of education, and substandard infrastructure which results in bad accessibility and connectivity to larger centres, despite not being amongst the most peripheral regions. The financial crisis also appears to have affected rural migration harder than any other type of regions

3.2. Critical evaluation of the monitoring system

One task of the testing was to evaluate the monitoring system with a pronounced focus on its functionality. With functionality we mean how well the system is able to provide *sufficient information* for assessing general territorial cohesion patterns and trends in the BSR and on the monitoring system's ability to highlight central features for possible policy deficits, development and/or evaluation. While this evaluation can be found in its full length in annex C4, some main findings are:

- Data gaps for Belarus and BSR Russia are assessed as very challenging. Although steps have been taken to partially improve this matter, many data gaps cannot be filled due to sheer unavailability of comparable information.
- No single *domain* has complete data for the chosen time series.
- Time series availability is on the whole somewhat restricted, best in the domain "Economic performance and competitiveness" and worst in the domain "Environmental qualities".
- The resources required for transferring data into information are in general rather substantial.
- The foreseen but subsequently dropped domain "Territorial cooperation and governance" constitutes a clear drawback in the monitoring system. However, addressing the issue with currently available data appears unrealistic.
- Possibilities to address BSR-specific territorial development arenas by utilisation of the monitoring system vary. The key themes of "Divides" as well as "Territorial capital" were addressed rather consistently in the testing exercise. At a general level the monitoring system is rather well suited for identifying trends and patterns within these particular themes.
- The monitoring system is also partially able to address broad trends within the themes "Innovation" and "Accessibility".
- Quantitative data on MSP lies far beyond the capacity of the monitoring system, whereas corresponding information regarding a limited number of environmental aspects have slightly better analytic prospects.
- Regarding the theme "Quality of cities", supplementing information e.g. from the Urban Audit Perception Surveys would enhance the opportunity to address this topic.
- The work with the developed ten indicators for measurement of territorial cohesion raises four principal issues, namely that: a panel of measurement instruments rather than a single one is needed; a thorough understanding of the limits and fall backs of each technique is a prerequisite; supporting evidence is also needed taking into account other background factors; and that the techniques should be utilised on more than a single variable.
- The methods used in TeMo have a rather high level of transferability and are at least partially applicable also on other macro or transnational areas in the EU or beyond.

4. Dissemination, deliveries and institutionalisation

4.1. Dissemination and stakeholder activities

There was a great interest in the TeMo project and already in the early phases of the project, extensive dissemination activities was carried out in order to inform about the project and to promote the knowledge about the Territorial Monitoring System in the Baltic Sea Region. Thus, the project has been presented for relevant stakeholders in meetings and conferences, and it has also been presented at ESPON seminars.

Stakeholder engagement has been carried out by engaging in continuous dialogue with the TeMo stakeholders throughout the project period. The main way of doing this has been by the organised workshops as well as discussing project advances in the Steering Committee meetings. Lists of dissemination activities and stakeholder engagement activities can be found in volume C.

4.2. Deliveries

The concrete outputs from the ESPON BSR-TeMo project are:

- The TeMo *Presentation Tool* (access to the entire territorial monitoring system)
- A *Summary publication* presenting in an easily accessible way the territorial monitoring system (in English and in Russian). A *flyer* has also been produced.
- ESPON deliveries documenting the project process, explaining the development of the territorial monitoring system as well as constituting a full set of the developed information useful for the future use and maintenance and update of the territorial monitoring system. Part A is the executive summary, Part B is this Final Report and Part C is the Scientific Report with 11 annexes. This includes for instance a Technical Specification (a technical document containing e.g. statistical definitions of indicators and technical information for implementation of the territorial monitoring system)

Specifically, the Scientific Report (C) is made up of the following Annexes which contain detailed information about the process, results and future of the ESPON BSR-TeMo:

Volume C1: Theoretical and political framework
Volume C2: The Territorial Monitoring System
Volume C3: Indicator presentation
Volume C4: Assessing territorial cohesion in the Baltic Sea Region (analysis and testing)
Volume C5: Visualisation issues
Volume C6: Presentation Tool User Manual
Volume C7: Project publications (Project summary, Project flyer and Project PPT)
Volume C8: Indicator and Variables - Technical Specification
Volume C9: Dissemination activities
Volume C10: Stakeholder involvement
Volume C11: Institutionalisation
Volume C12: References

The *Summary publication* is a document of 11 pages targeting the politicians and practitioners as potential users of the Monitoring System. The publication introduces the different parts of the Monitoring System in a non-technical way (e.g., domains, indicators and spatial patterns). The intention is also to inspire the users of the Territorial Monitoring System on how to use the system and how to interpret the results.

The publication consists of a mix of text and visualisation elements (maps, charts and graphs) and is available in the form of a pdf-document that enables its easy distribution to interested users both via email and via relevant web pages. It is written in English and also translated into Russian which will facilitate the dissemination of the Monitoring System to a wider audience in the Baltic Sea Region including the non-EU states (the Russian Federation and Belarus). The summary publication is layouted for easy printing after the project ends.

As described, the TeMo *Presentation Tool* is a browser application developed as part of the TeMo Territorial Monitoring System. The User manual for the *Presentation Tool* gives a user-oriented introduction to the tool. The User Manual presents step-by-step descriptions on how to use the *Presentation Tool*, how to obtain and retrieve information, and how to navigate through the system. This document neither provides insights into the policy relevance of the monitoring system nor information on any technical aspects but focuses on providing guidelines for using the *Presentation Tool*.

The *Technical Specification* is a purely technical document targeted to GIS and analytical experts for future updates of the monitoring system. This document defines and explains in detail the indicators, indicator metadata, implementation, updating mechanisms, domain set up, and headline indicators of the monitoring system. The Technical Specification is an essential document for enabling future maintenance and update of the Monitoring System.

4.3. Institutionalisation

A monitoring system can only live up to its potential if it is continuously updated and utilised in policy making. Therefore, it is necessary to regularly update the data; adjust the system as a whole to future policy needs; carry out analyses, and disseminate both the system and the results to users of the system. Obviously, future system updates are beyond the scope of the BSR TeMo project, which ends in February 2014.

In the TeMo Project Specification it is stated that '*it is important to define a roadmap on how to maintain, update and revise the Monitoring System*'. Such a 'road map' includes a number of elements among which technical specifications for how the monitoring system is updated; listing the sources for the data gathering; indicating how often and at which geographical scale the indicators should be updated; and outlining options for the analysis of the territorial development are the elementary ones. All of this is part of the documentation found in the various annexes of the Scientific Report (Part C).

However, these tasks are not undertaken without appointing a specific organisational form to be responsible for this update and to decide on how this could be implemented (administratively, financially, organisational/operational) and at which ambition level this update should take place. It is namely important to keep in mind that the institutionalisation suggestions are closely related to the ambitions for the usability of the monitoring system in terms of scope of actions and costs. In this respect it is also important to stress that the higher the ambition level, the more relevant the monitoring system becomes for policy making in the Baltic Sea Region, and the more relevant it is,

the higher the frequency of usage and appreciation of the system will be at the same time.

The ambition level can be adjusted for a range of parameters, of which data updates are only one aspect to consider[8]. Other parameters include functions, type of analyses, and dissemination and stakeholder involvement.

A less ambitious solution would imply only minimum data updates, no functional and analytical enhancements in future, and only limited dissemination activities. In contrary, very ambitious solutions could imply detailed and highly frequent data updates, a series of new functionalities and large extensions of new types of analyses, and very active dissemination activities. One could also think of mixed solutions, where for instance data updates and dissemination are given high priorities (i.e. are very ambitious), while functional and analytical enhancements are given less priorities (or vice versa).

In the dedicated annex, volume C11, four suggestions for how to institutionalise the monitoring system are brought forward for consideration: the project model, institution form, cooperation model and network model. The project model implies carrying out the future maintenance of the monitoring system on a project basis; the institution model that the monitoring system is hosted by a specific organisation who are then responsible for the tasks; the cooperation model that a group of stakeholders each are responsible for designated tasks of the future maintenance; and finally the network model where a group of stakeholders more loosely work towards ensuring the future maintenance. The models are described more extensively in volume C11 of the Scientific Report but the main advantages and disadvantages for each suggestion are listed in Table 6.

Table 6 Advantages and disadvantages of the four institutionalisation suggestions

	Advantages	Disadvantages
Project model	▪ Clear time frame ▪ Well-defined task ▪ Inclusions of various experts ▪ Potentially lower costs through tendering	▪ No continuity ▪ Each time start from scratch (particularly if a new project team is appointed) ▪ System enhancements difficult to establish (particularly with new team) ▪ No synergies ▪ Danger of non-funding periods (time gaps) ▪ Danger of different budget levels
Institution form	▪ Continuity ▪ Synergies with related activities of the institution ▪ High degree of (quality) control ▪ Extensions, advanced analyses, and system improvements easy to implement ▪ Lower management / administrative costs	▪ „Monopoly" situation for the institution in charge ▪ Danger of „higher costs" ▪ Potentially diminished stakeholder input ▪ Higher difficulties to include new views / new ideas into the system in future ▪ In future institution might lose interest in monitoring system

[8] Often data updates are thought of as the only critical task; nevertheless, it should be stressed that updating functionalities, extended range and type of analyses, and also dissemination activities may consume a lot of time for a successful and sustainable monitoring system.

Cooperation model	▪ High degree of stakeholder involvement ▪ Consensus driven ▪ Using individual strengths of each partner	▪ Risk of tasks 'falling out' ▪ Risks of high cost due to little agreement on tasks ▪ Consensus driven ▪ Higher administrative and management costs
Network model	▪ Simple/informal ▪ Shared responsibility ▪ Using individual strengths of each partner ▪ Easy to add new partners in future	▪ Simple/informal ▪ Responsibilities difficult to establish ▪ Little control ▪ Extensions difficult to implement ▪ No synergies

4.3.1. Recommendations from the TPG

While the ambition level for the future of the monitoring system is closely related to available funding for such a task, the prioritisation between the above mentioned parameters for the selection of the best institutionalisation solution is a political question – i.e. which parameters are the most important for maintaining the primary stakeholders' interest in the monitoring system.

However, with the interest of the territorial monitoring system in mind, the TPG recommends the suggestions that ascribe a clear division of responsibilities and in this sense would favour the institution form or the cooperation model (provided that it is possible to define clear roles of the involved actors and clear goals and ambitions for the monitoring). Since the temporal aspect is also important for monitoring in the long term, a more permanent solution than the project form is favoured, since the project form should only be favoured as an interim solution (such as the TeMo project in the development phase) or in combination with either the institution form or the cooperation model when certain tasks would benefit from being established in project form.

Furthermore, the TPG asks that the high degree and rather diverse requirements of knowledge capacity of the actors carrying out the data update and indicator analysis is kept in mind when selecting between the institutionalisation suggestions. Also, synergy with data and indicator updates from 'outside' of the BSR territorial monitoring system is another aspect to consider.

It has been requested during the final stages of the project (by the stakeholders) to get some estimate of what would be the requirements for running the monitoring system. This would obviously depend on the institutional setting that is chosen, if the work is to be conducted by someone familiar with the project, and how much of the work that was conducted during the actual project that should be "updated".

Given that we perceive the monitoring system to be all components of the TeMo project- i.e. data, indicators (simple and complex), policy relevance, visualisation, analysis and dissemination – we will provide some suggestions for the benefit of future discussion.

The estimates below are based on that all major task are pursued by someone familiar with the monitoring project and the institutional setting is at this point open (it could be work carried out within an institution or as a project). The time is also estimated based on a one year cycle of running the system. We also assume that the necessary GIS software and statistical software is available.

Table 7 Estimate of time required for running BSR TeMo one year

Tasks	Time (in months)
Database update:	1
Production of maps and tables:	1
Update and maintenance of presentation tool:	0.5
Networking and liaison with stakeholders:	0.25
Testing and analysis:	1
Dissemination and promotion activities:	0.5
Reporting and documentation:	1
Management (project and financial):	0.5
Total	**5.75**

Hence, we perceive that in total around 6 months would be necessary for keeping the system "alive" a year. Obviously this would be different if the system had been left untouched for a few years – then some time would be needed to get familiar with data, mapping, tools, stakeholders, etc. It should also be pointed out that this would not imply that 6 months each calendar year would need to be devoted to this task; some tasks can be pursued in parallel. However, some tasks are sequential – like data collection – mapping – analysis.

The data compiled and the analyses carried out during the lifetime of the TeMo project is based on latest data entries from 2011/2012 at the best, and for indicators where one or several statistical bureaus lag in data provision behind their ideal time frame, even as early as 2009. Therefore the TPG suggests that - in order to avoid a drastic time gap in the monitoring already from the outset of the continuation of the BSR territorial monitoring - a solution to ensure continuous updates of the data is sought. Particularly updating the headline indicators could be one way of ensuring at least some level of continuity. If desired, this update could be flanked by testing of other themes than the ones chosen for the TeMo project or by deeper analysis of the resulting slightly longer time lines, should the stakeholders find that interesting.

5. Links to other ESPON Projects

Since it was a requirement that the territorial monitoring system developed within the TeMo project to a largest degree possible use the statistical data and time series already available within the ESPON programme, and here in particular the ones developed within the framework of the INTERCO and ESPON 2013 Database Project, there are obviously clear linkages and synergies between the BSM-TeMo and other ESPON projects.

The results and findings from other ESPON projects, mainly from the current programming period, were considered and used during all phases of the BSM-TeMo project. Different type of information and material from the ESPON projects was considered and integrated in the BSM-TeMo project, such as:

- Data and indicators
- Methodology
- Project reports

While the linkages to the most relevant ESPON projects from previous programming periods are accounted for in volume C1 on "Theoretical and political framework" and in the conceptual chapter of the development of the territorial monitoring system (in volume C2), below we outline the incorporation of the most relevant ESPON projects from the current programming period.

ESPON Database 2013 and **ESPON Database 2013 Phase II** were used for the integration of all indicators, their classification and codification as well as data availability within the ESPON Database.

The results of the **INTERCO - Indicators of Territorial Cohesion** project were extensively used in the implementation of the BSM-TeMo project. Of particular importance were the Territorial Indicators and Indices developed by the project that could be used to support policy makers in measuring and monitoring territorial cohesion, complex territorial development, territorial challenges and opportunities, etc.

ESPON CLIMATE - Climate Change and Territorial Effects on Regions and Local Economies in Europe analyses how and to which degree climate change will impact on the competitiveness and cohesion of European regions and Europe as a whole. The project was particularly consulted with regard to development of the climate change sensitivity and adaptive capacity indicators of the regions.

ETMS - **EU Territorial Monitoring System** is highly relevant for the implementation of the BSM-TeMo project. The project aims at providing a practical and operational European Territorial Monitoring System, which builds mainly on existing statistical information, data and tools developed (database, mapping tools) within the ESPON Programme, and which can be the base for a continued monitoring of European territorial trends. However, due to the uneven timing of the two projects, the indicator selection of the TeMo project was completed before the ETMS started on this. However, it is expected that the two monitoring system can complement each other with regard to further development of the monitoring systems, in particular when it comes to visualization solutions and reference values for indicators used in both projects.

A similar uneven timing exists between TeMo and the **KITCASP** - **Key Indicators for Territorial Cohesion and Spatial Planning** but some of the material was found useful for BSM-TeMo project in helping to elaborate the monitoring systems for territorial

cohesion covering EU territory. For example, the TeMo project looked into the key territorial development challenges and existing spatial monitoring arrangements in the case study territories outlined in the Interim report, as well as the key drivers and development priorities for appropriate national territorial monitoring indicators identified during the consultation workshops with stakeholders.

TANGO - Territorial Approaches for New Governance project was considered in relation to their development of a set of indicators for 'good' territorial governance in Europe. However, within the Tango project no quantitative indicators for governance have been developed.

TIPSE - Territorial Dimension of Poverty and Social Exclusion in Europe aims to develop better understanding of the territorial pattern of poverty and social exclusion in European regions as well as its development over time. BSM-TeMo used the social exclusion indicators and the regional data presented in the project Interim report. Moreover, BSM-TeMo looked into 'Poverty Mapping' which is being developed throughout the project.

The results of the **TPM** - **Territorial Performance Monitoring** project were used with regard to understanding territorial development at the regional level; the impact of the macro-challenges (climate change, energy supply, demographic development and globalization) on the regional level and understanding how to deal with these challenges effectively.

The regional indicators of transport accessibility and impact in Europe developed during the **TRACC - TRansport ACCessibility** project were incorporated into the BSR-TeMo. TRACC will also provide latest accessibility calculations to TeMo, as soon as they are available.

Several other ESPON projects were consulted and referred to during the implementation of the BSM-TeMo project. In particular, such projects as **ESPON Online Mapping Tool, ESPON Database Portal, ESPON HyperAtlas, European Urban Benchmarking Webtool and ESPON Online MapFinder, OLAP Cube, ESPON Atlas, ESPON 2020 Atlas** and **Data Navigator** were relevant to consult when considering how to deal with the use of data and addressing the technical aspects of development.

Finally, the testing of the indicators of the TeMo monitoring system has made extensive use of the ESPON typologies both in the testing/application phase as well as in the construction of the complex indicator module.

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